Invacare® STORM⁴
SERVICE MANUAL

CE

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INVACARE

These instructions contain information about:

Testing work

Repair Instructions

This manual is part of the instructions for use.

Service addresses

A	**Invacare Austria GmbH**	(:	+43 6232 5 53 50
	Herzog Odilostrasse 101	Fax:	+43 6232 5 53 54
	A-5310 Mondsee	@:	info@invacare-austria.com
	Austria	WWW:	www.invacare.at
B L	**Invacare n.v.**	(:	+32 (0)50 83 10 10
	Autobaan 22	Fax:	+32 (0)50 83 10 11
	B-8210 Loppem (Brugge)	@:	belgium@invacare.com
	Belgium	WWW:	www.invacare.be
CH	**Invacare AG**	(:	+41 (0)61487 70 80
	Benkenstraße 260	Fax:	+41 (0)61487 70 81
	CH-4108 Witterswil	@:	switzerland@invacare.com
	Switzerland	WWW:	www.invacare.ch
D	**Invacare Aquatec GmbH**	(	+49 (0)7562 70 00
	Alemannenstraße 10	Fax	+49 (0)7562 7 00 66
	88316 Isny	@:	info@invacare-aquatec.com
	Deutschland	WWW:	www.invacare-aquatec.de
DK	**Invacare A/S**	((Kundeservice):	+45 (0)36 90 00 00
	Sdr. Ringvej 37	Fax (Kundeservice):	+45 (0)36 90 00 01
	DK-2605 Brøndby	@:	denmark@invacare.com
	Danmark	WWW:	www.invacare.dk
E	**Invacare® SA**	(:	+34 (0)972 49 32 00
	c/ Areny s/n	Fax:	+34 (0)972 49 32 20
	Polígon Industrial de Celrà	@:	contactsp@invacare.com
	E-17460 Celrà (Girona)	WWW:	www.invacare.es
	ESPAÑA		
F	**Invacare® Poirier SAS**	(:	+33 (0)247 62 64 66
	Route de St Roch	Fax:	+33 (0)247 42 12 24
	F-37230 Fondettes	@:	contactfr@invacare.com
	France	WWW:	www.invacare.fr

GB	**Invacare® Ltd**	((Customer services):	+44 (0)1656 77 62 22
	Pencoed Technology Park	Fax (Customer services):	+44 (0)1656 77 62 20
	Pencoed	@:	uk@invacare.com
	Bridgend CF35 5HZ	WWW:	www.invacare.co.uk
	United Kingdom		
I	**Invacare Mecc San s.r.l.**	(:	+39 0445 38 00 59
	Via dei Pini, 62	Fax:	+39 0445 38 00 34
	I - 36016 Thiene (VI)	@:	italia@invacare.com
	Italia	WWW:	www.invacare.it
IE	**Invacare Ireland Ltd.**	(:	+353 18 10 70 84
	Unit 5 Seatown Business Campus	Fax:	+353 18 10 70 85
	Seatown Rd, Swords	@:	ireland@invacare.com
	County Dublin	WWW:	www.invacare.ie
	Ireland		
N	**Invacare® AS**	((Kundeservice):	+47 (0)22 57 95 00
	Grensesvingen 9	Fax (Kundeservice):	+47 (0)22 57 95 01
	Postboks 6230	@:	norway@invacare.com
	Etterstad	@:	island@invacare.com
	N-0603 Oslo	WWW:	www.invacare.no
	Norge		
NL	**Invacare® B.V.**	(:	+31 (0)318 69 57 57
	Celsiusstraat 46	Fax:	+31 (0)318 69 57 58
	NL-6716 BZ Ede	@:	nederland@invacare.com
	Nederland	@:	csede@invacare.com
		WWW:	www.invacare.nl
P	**Invacare Lda**	(:	+351 225 10 59 46
	Rua Estrada Velha, 949	(:	+351 225 10 59 47
	P-4465-784 Leça do Balio	Fax:	+351 225 10 57 39
	Portugal	@:	portugal@invacare.com
		WWW:	www.invacare.pt

S FIN	**Återförsäljare:** **Invacare® AB** Fagerstagatan 9 S-163 91 Spånga **Sverige**	((Kundtjänst): Fax (Kundtjänst): @: @: WWW:	+46 (0)8 761 70 90 +46 (0)8 761 81 08 sweden@invacare.com finland@invacare.com www.invacare.se
	Tillverkare: **Invacare® Deutschland GmbH** Kleiststraße 49 D-32457 Porta Westfalica **Deutschland**	MÖLNDAL (: Fax: @: LANDSKRONA (: Fax: @: OSKARSHAMN (: Fax: @:	 +46 (0)31 86 36 00 +46 (0)31 86 36 06 ginvacare@invacare.com +46 (0)418 2 85 40 +46 (0)418 1 80 89 linvacare@invacare.com +46 (0)491 1 01 40 +46 (0)491 1 01 80 oinvacare@invacare.com
Eastern european countries	**European Distributor Organisation (EDO)** Kleiststraße 49 D-32457 Porta Westfalica **Deutschland**	(Fax @: WWW:	+49 (0)5731 75 45 40 +49 (0)5731 75 45 41 edo@invacare.com www.invacare.de

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1 Introduction

1.1 General information

- Service and maintenance work must be carried out taking this service manual into account.
- It is imperative that you observe safety information.
- Information about operation or about general maintenance and care work on the mobility aid should be taken from the operating manual.
- You can find information about ordering spare parts in the spare parts catalogue.
- Only use original Invacare® spare parts. The guarantee will become invalid if other spare parts are used!
- We reserve the right to make any alterations on the grounds of technical improvements.
- The mobility aid may only be maintained and overhauled by qualified personnel.
- The minimum requirement for service technicians is suitable training, such as in the cycle or orthopaedic mechanics fields, or sufficiently long-term job experience.
  - Experience in the use of electrical measuring equipment (multimeters) is also a requirement.
  - Special Invacare® training is recommended.
- Alterations to the mobility aid which occur as a result of incorrectly or improperly executed maintenance or overhaul work lead to the exclusion of all liability on the side of INVACARE.
- If you have any problems or questions please contact Invacare® Service.

1.2 Notes on transport

- If the mobility aid has to be shipped back to the manufacturer for major repairs, you should always use the original packaging for transport.
- Please attach a precise description of the fault.

1.3 Definition and representation of information and safety information in this manual

Different types of information and signal words are used throughout this manual.

HAZARD!

The signal word "HAZARD!" refers to immediate hazards.

· *The following lines in italics refer to actions which serve to avoid such hazards.*

WARNING!

The signal word "WARNING!" refers to possibly-occurring hazards which can lead to death or serious injuries if they are not avoided.

· *The following lines in italics refer to actions which serve to avoid such hazards.*

ATTENTION!

The signal word " ATTENTION!" refers to possibly-occurring hazards which can lead to minor injuries and/or material damage if they are not avoided.

· *The following lines in italics refer to actions which serve to avoid such hazards.*

CAUTION!

The signal word "CAUTION!" refers to hazards which could lead to material damage if they are not avoided.

· *The following lines in italics refer to actions which serve to avoid such hazards.*

Note

The signal word "Note" is used to denote general information which simplifies the handling of your product and refers to special functions.

1.4 Hazard symbols and symbols used

Different types of hazard symbols and symbols are used throughout this manual.

General hazards

This symbol warns you of general hazards!

· *Always follow the instructions to avoid injury to the user or damage to the product*!

BURN HAZARD!

This symbol warns you of the danger of chemical burns, for example due to the discharge of battery acids!

· *Always follow the instructions to avoid injury to the user or damage to the product*!

DANGER OF CRUSHING!

This symbol warns you of crushing hazards due to inattentive working with heavy components.

· *Always follow the instructions to avoid injury to the user or damage to the product*!

EXPLOSION HAZARD!

This symbol warns you of an explosion hazard, which can be caused by excessive tyre pressure in a pneumatic tyre.

· *Always follow the instructions to avoid injury to the user or damage to the product*!

Wear safety shoes

The symbol refers to the requirement for wearing safety shoes.

· *Wear standardised safety shoes during all work.*

Wear eye protection

This symbol refers to the requirement for wearing eye protection, for example when working with batteries.

· *Wear eye protection when this symbol is shown.*

Wear safety gloves

This symbol refers to the requirement for wearing safety gloves, for example when working with batteries.

· *Wear safety gloves when this symbol is shown.*

Note

This symbol identifies general information which is intended to simplify working with your product and which refers to special functions.

Requirements:

· This symbol identifies a list of various tools, components and items which you will need in order to carry out certain work. Please do not attempt to carry out the work if you do not have the listed tools available.

Always dispose used or damaged batteries correctly

The symbol refers to information for the correct disposal of used or damaged batteries.

1.5 Images in this manual

The detailed images in this manual are given digits to identify various components. Component numbers in text and operational instructions always relate to the image directly above.

2 Safety and fitting instructions

These safety instructions are intended to prevent accidents at work, and it is imperative that they are observed.

2.1 Before any inspection or repair work

- Read and observe this repair manual and the associated operating manual!
- Observe the minimum requirements for carrying out the work (see chapter entitled " General information)!

2.2 Personal safety equipment

Safety shoes

The mobility device, and some of its components, are very heavy. These parts can result in injuries to the feet if they are allowed to drop.

- *Wear standardised safety shoes during all work.*

Eye protection

It is possible that battery acid can be discharged when working on defective batteries or when handling batteries improperly.

- *Always wear eye protection when working on any defective or possibly defective batteries.*

Safety gloves

It is possible that battery acid can be discharged when working on defective batteries or when handling batteries improperly.

- *Always wear acid-proof safety gloves when working on any defective or possibly defective batteries.*

2.3 General safety information and information about fitting / removal

WARNING: Danger of crushing!

Various components such as the drive unit, batteries, seat etc are very heavy. This results in injury hazards to your hands!

- *Please note the high weight of some components*! *This applies especially to the removal of drive units, batteries and the seat.*

WARNING!

Injury hazard if the vehicle starts moving unintentionally during repair work!

- *Switch the power supply off (ON/OFF key)!*
- *Engage the drive!*
- *Before jacking up, secure the vehicle by using chocks to block the wheels.*

ATTENTION!

Fire and burn hazard due to electrical short-circuit!

- *The mobility device must be completely switched off before removal of voltage-carrying components! To do this, remove the batteries.*
- *Avoid short-circuiting the contacts when carrying out measurements on voltage-carrying components!*

CAUTION!

Danger of burns from hot surfaces on the motor!

- *Allow the motors to cool down before commencing work on them.*

ATTENTION!

Injury hazard and danger of damage to vehicle due to improper or incomplete maintenance work!

- *Use only undamaged tools in good condition*.
- *Some moving parts are mounted in sockets with PTFE coating (Teflon™). Never grease these sockets!*
- *Never use "normal" nuts instead of self-locking nuts.*
- *Always use correctly-dimensioned washers and spacers*
- *When reassembling, always replace any cable ties which were cut during dismantling.*
- *After completing your work / before renewed start-up of the mobility device, check all connections for tight fitting.*
- *After completing your work / before renewed start-up of the mobility device, check all parts for correct locking.*
- *Only operate the vehicle with the approved tyre pressures (see technical data).*
- *Check all electrical components for correct function. Please note that incorrect polarity can result in damage to the electronics.*
- *Always carry out a trial run at the end of your work.*

CAUTION!

Danger of injury and damage to property, if the maximum speed reduction on a wheelchair with a lifter does not function correctly!

The wheelchair's control unit must reduce the maximum possible speed as soon as the lifter is raised.

- *Test the maximum speed reduction for correct function after any maintenance work or modifications to the wheelchair.*

Note

Mark all current settings for the mobility aid (seat, armrests, backrest etc.), and the associated cable connecting plugs, before dismantling. This makes reassembly easier.
All plugs are fitted with mechanical safety devices which prevent release of the connecting plugs during operation. To release the connecting plugs the safety devices must be pressed in. When reassembling ensure that these safety devices are correctly engaged.

CAUTION!

Any changes to the drive program can affect the driving characteristics and the tipping stability of the vehicle!

- *Changes to the drive program may only be carried out by trained Invacare® specialist dealers!*
- *Invacare® supplies all mobility aids with a standard drive program ex-works. Invacare® can only give a warranty for safe vehicle driving behaviour - especially tipping stability - for this standard drive program!*

3 Tightening torques

The tightening torques stated in the following list are based on the thread diameter for the nuts and bolts for which no specific values have been determined. All values assume dry and de-greased threads.

Thread	M4	M5	M6	M8	M10	M12	M14	M16
Tightening torque in Nm ±10%	3 Nm	6 Nm	10 Nm	25 Nm	49 Nm	80 Nm	120 Nm	180 Nm

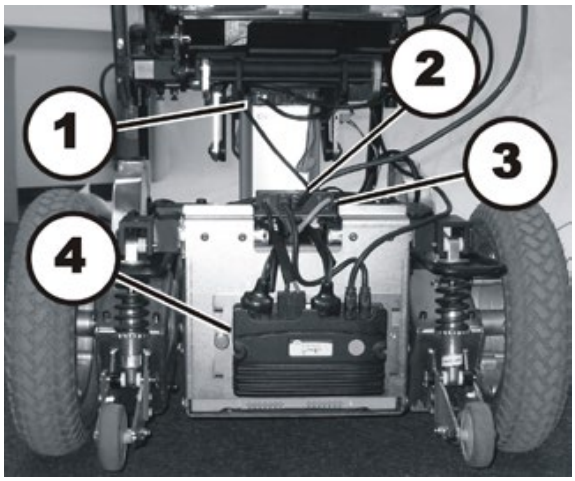
CAUTION!

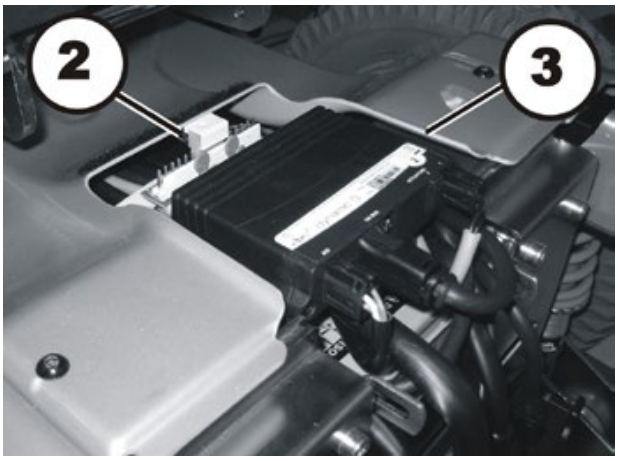
Damage can be caused to the mobility device due to improperly tightened screws, nuts or plastic connections.

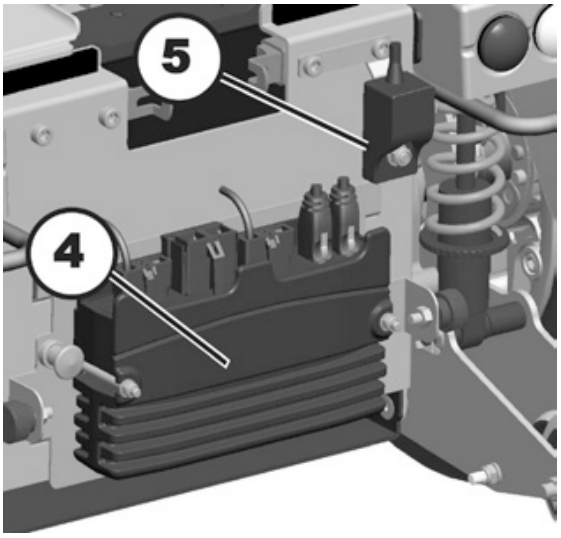
- *Always tighten screws, nuts etc to the stated tightening torque.*
- *Only tighten screws or nuts which are not listed here fingertight.*

4 Layout of components and componentry

4.1 Overview







The electronic control modules and regulators are situated at the rear underneath the rear plastic cover and directly under the seat.

Directly under the seat:

- Actuator module (1)
  The actuator module is optional. If available, it controls the electric leg supports, the electric tilt module and the electric back adjustment.

Underneath the rear cover:

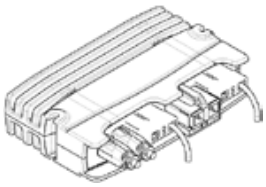
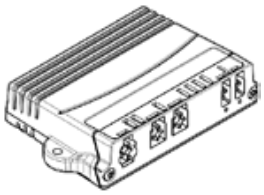
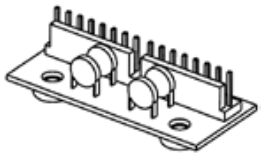
- Light terminal block (2)
  The light terminal block is in front of the actuator module (3). The light terminal block is optional. It is only available if the mobility aid is fitted with lighting.
- Actuator module (3)
  The actuator module is on the top of the battery compartment. The actuator module is optional. It is only available if the mobility aid is fitted with a lifter.

- Power module (4)
  The power module is at the rear of the battery compartment.
- G-Trac (5)
  The G-Trac sensor is located in the rear on the right, next to the battery box.

4.2 Electronics modules

A variety of electronics modules can be fitted to the mobility aid.

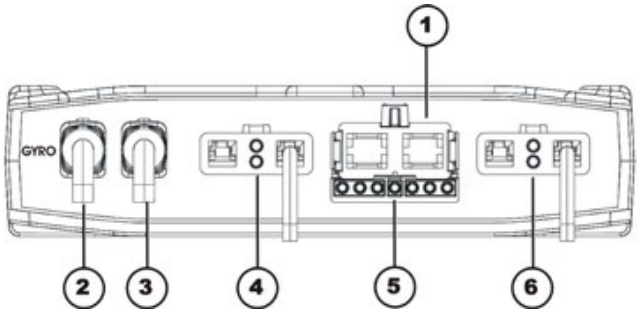
Before you connect mobility aid components such as adjusting motors/actuators or motors, please begin by ascertaining which module is installed. Please refer to the following table for an overview.

Electronic module	Designation	Notes
	Power module ACS 2 PMA90L	The following remotes can be connected: - REM 24 SD - REM A - REM B - REM 550
	Actuator module ACT 2 / ACT 4	The actuator module is optional.
	Lighting PCB	The lighting PCB is optional.
	G-Trac sensor	The G-Trac sensor is optional

4.2.1 ACS 2 PMA90L electronics module

Connections

1) Battery 24V
2) Cable to G-Trac sensor (GYRO
3) Bus cable (to remote or ACT)
4) Motor M1
5) Light
6) Motor M2



Rubber stoppers for free slots

2) & 3) Order number: 1552876

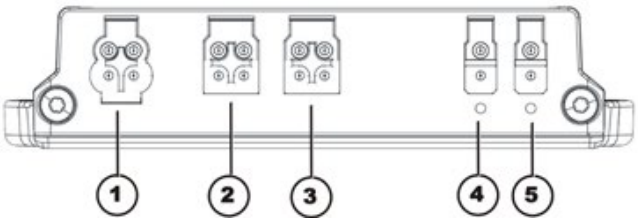
4.2.2 ACT actuator module

A range of adjusting motors, also known as actuators, can be fitted to the mobility aid. These actuators are either connected directly to the power module or to a separate actuator module. The actuator module is connected to the power module via a bus cable.

4.2.2.1 ACT 2 actuator module

Connections

1) ACI*
2) Bus cable (to remote or ACT)
3) Bus cable (to remote or ACT)
4) Adjusting motor/actuator - Channel 2
5) Adjusting motor/actuator - Channel 1



Rubber stoppers for free slots

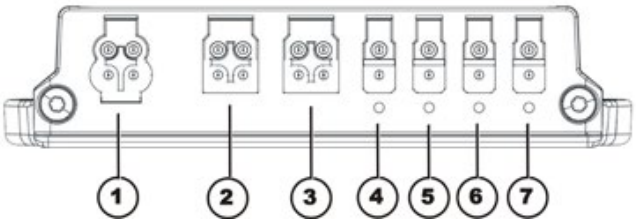
1) Order number: 1555701
2) & 3) Order number: 1552876
4) & 5) Order number: 1555700

* The ACI connection is used for actuator limitation or speed reduction.

4.2.2.2 ACT 4 actuator module

Connections

1) ACI*
2) Bus cable
   (to remote or power module)
3) Bus cable
   (to remote or power module)
4) Actuator - Channel 4
5) Actuator - Channel 3
6) Actuator - Channel 2
7) Actuator - Channel 1



Rubber stoppers for free slots

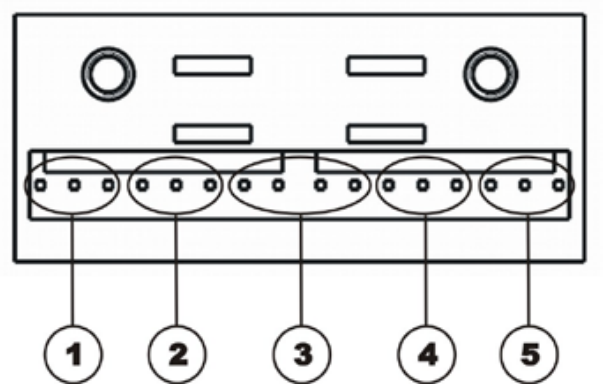
1) Order number: 1555701
2) & 3) Order number: 1552876
4) to 7) Order number: 1555700

* The ACI connection is used for actuator limitation or speed reduction.

4.2.3 Lighting PCB

Connections

1) Driving light & l.h. indicator 1
2) Driving light & l.h. indicator 2
3) Power module
4) Driving light & r.h. indicator 1
5) Driving light & r.h. indicator 2



The lighting PCB connections are printed directly on the circuit board.

4.3 Joystick boxes

Various remotes can be used on the mobility aid.

Before you connect any mobility aid components such as adjusting motors/actuators or motors, you should first ensure that you know exactly which joystick box has been fitted. Please refer to the following table for an overview.

Remote	Designation	Notes
	REM 24 SD	Can be connected to power module ACS 2 PMA90L.
	REM A	Can be connected to power module ACS 2 PMA90L.

Remote	Designation	Notes
	REM B	Can be connected to power module ACS 2 PMA90L.
	REM 550	Can be connected to power module ACS 2 PMA90L.

5 Service plan (1x annually)

CAUTION!

Danger of injury and damage to property, if the maximum speed reduction on a wheelchair with a lifter does not function correctly!

The wheelchair's control unit must reduce the maximum possible speed as soon as the lifter is raised.

· *Test the maximum speed reduction for correct function after any maintenance work or modifications to the wheelchair.*

Component	Check	Remedy	Notes	ü
Safety belt	Damage to safety belt	Replace belt if damaged.	See chapter 9.1.	
	Belt lock function	Replace belt if damaged.	See chapter 9.1.	
Armrests	Damage to armrests	Replace covering if damaged		
	Armrest fixings	Tighten screws		
Side panels	Damage to side panels	Replace side panels if damaged		
	Side panel fixings	Tighten screws		
Seat angle adjustment	Tight fit of the pin retainers	Replace pin retainers if necessary		
Lifter (manual or electric)	Check screws	Tighten screws		
Power backrest (if fitted)	Damage to backrest Seams Fixing Check cable Check function	Replace parts if damaged Tighten screws Replace cable motor if necessary		
Frames (chassis) / battery mounting	Carry out a visual check of the fasteners, rivets and battery receptacle	Tighten screws Replace components if necessary		
DAHL Docking Station	Check screws	Tighten screws		

Component	Check	Remedy	Notes	ü
Wheel suspension and wheels	Check drive wheels for tight fit and side play	Adjust, replace wheel hubs	See chapters 8.10.1 and 8.10.3.	
	Check steering wheels for tight fit, float and side play	Replace wheels, wheel fork or wheel bearings	See chapter 8.8.	
	Tyres	Repair or replace if damaged	See chapter 8.10.2.	
	Check suspension	Repair or replace if damaged	See chapter 8.13.	
	Check straight running	Replace wheels, wheel fork or wheel bearings	See chapter 8.8.	
Drive units, clutch mechanism	Motors	Check motors	See chapter 7.	
	Check functions in drive and push modes Check clutch mechanism	Check carbon brushes, replace if necessary Replace motor if necessary. Tighten screws/nuts, adjust or replace if necessary	See chapters 8.11.1 and 8.11.4.	
Brakes	Inspect motor brake	Check motor brake	See chapter 7.2.	
Legrests	Check welded seams, interlocking, screws, footplates	Tighten, replace if necessary		
Power legrests (if fitted)	Check cable Check contacts check functions	Replace cable if necessary		
Lighting (if fitted)	Check cable Check function	Replace lamp or cable if necessary	See chapter 8.7.	
Battery mounting	Check battery support and mounting belts for damage	Replace if necessary		

Component	Check	Remedy	Notes	ü
Batteries	Check batteries for damage	Replace batteries if necessary	See chapters 8.4.2 and 8.4.3.	
	Check battery voltage	Charge batteries		
	Check battery voltage	Charge batteries	See operating manual	
	Check contacts and terminals	Clean contacts and terminals	Please refer to the safety information in chapter 8.4.2 and 8.4.3 for handling batteries	
Remote / electronics modules	Remote, status display blinking	Evaluate error/blink code	See chapter 6.	
	Fixings	Tighten fixings, replace if necessary		
	Cables and connecting plugs	Tighten cables and connecting plugs, replace if necessary		
	Drive lever function	Replace drive lever if necessary Replace remote if necessary		
	Power supply	Tighten cables and connecting plugs, replace if necessary		
Drive program	Check drive electronics program version	Update software if newer version available.	See chapter 8.3.	

6 Operational faults

Different power modules can be installed in the mobility aid in connection with different remotes. The rectification of operational faults depends on the installed power module in each case.

The power modules used are described in chapter 4.2.

Note
The tables for rectification of operational faults listed in the following chapters are only an excerpt from the original manufacturer's manuals.
You can obtain the original manuals from Invacare®.

If you have problems with the mobility aid, please proceed as follows:

- First assess the possible cause of the problem using the following table.
- Check the remote status display. Evaluate the error code.
- Carry out the necessary checks and repairs as recommended in the following table.

6.1 Drive fault diagnosis

PROBLEM	OTHER SYMPTOMS	POSSIBLE CAUSE	SOLUTION	Documentation
Mobility aid will not start	The remote status display illuminates normally and displays blink code 5/6.	Drive motors disengaged	Engage drive motors	See operating manual
	Remote status display does not illuminate	Batteries defective	Replace batteries	See chapter 8.4.2.
		Completely discharge battery	Pre-charge batteries	See operating manual
		Power supply to remote interrupted	Check master fuse	See chapter 8.5.
			Check cables between the modules for loose connections and damage	See chapter 8.6.
		Remote defective	Replace remote	See chapter 8.2.1.
	Remote status display blinking	Various causes	Assess error code	See chapter 6.2.
Mobility aid judders in drive mode	None	Batteries defective (unstable voltage)	Replace batteries	See chapter 8.4.2.
		Drive motor(s) defective	Replace motor(s)	See chapter 8.11.1.
			Replace carbon brushes	See chapter 8.11.4.
Mobility aid pulls to left or right	None	Drive motors running asymmetrically	Change programming to synchronise motors.	See chapter 8.3.
	Tyre visibly dented	Not enough air in the tyre	Check air pressure, replace inner tube and/or valve if necessary.	See chapter 8.10.2.
Error message does not go out	None	Bad connections	Check all connecting cables.	See chapter 8.6.
		Motor brake defective	Measure internal resistance of brakes, replace motor if defective.	See chapters 7.2 and 8.11.1

PROBLEM	OTHER SYMPTOMS	POSSIBLE CAUSE	SOLUTION	Documentation
Motors stop and start again	None	Voltage decline	Stop journey and allow electronics to cool down.	
Motor runs but loses power	None	High motor load allows the power module to lower the voltage.	Stop journey and allow electronics to cool down.	
Motors stop and do not start again	None	High motor load allows the power module to lower the voltage.	Leave mobility aid switched on and let the power module operate. Charge batteries overnight with mobility aid switched on.	
	None	Fuse burnt out	Check cabling and replace fuse	See chapters 8.6 and 8.5
	None	Motor defective	Check carbon brushes and replace if necessary	See chapter 8.11.4.
			Measure internal resistance of motor, replace motor if defective.	See chapters 7.1 and 8.11.1
	None	Power module defective	Replace power module	See chapter 8.2.2.
Motors lose power during journey	None	Bad connections	Switch mobility aid off, wait 10 seconds, switch mobility aid on again. Check all cabling.	See chapter 8.6.
Motor judders or runs irregularly, or only one motor runs	None	Carbon brushes worn	Check carbon brushes and replace if necessary	See chapter 8.11.4.
		Bearing defective	Replacing the motor	See chapter 8.11.1.
		Collector defective	Measure internal resistance of motor, replace motor if defective.	See chapters 7.1 and 8.11.1

PROBLEM	OTHER SYMPTOMS	POSSIBLE CAUSE	SOLUTION	Documentation
Motors do not run	None	Bad connections	Check all cabling.	See chapter 8.6.
		Fuse burnt out	Check cabling and replace fuse	See chapters 8.6 and 8.5
		Batteries defective	Replace batteries	See chapter 8.4.2.
		Cabling to power module or remote defective	check cabling	See chapter 8.6.
		Power module defective	Replace power module	See chapter 8.2.2.
	Corroded contacts	Water, salt or urine has penetrated	Check cabling, replace if necessary.	See chapter 8.6.
Motor makes clicking noise	None	Bearing defective	Replacing the motor	See chapter 8.11.1.
		Collector defective	Measure internal resistance of motor, replace motor if defective.	See chapters 7.1 and 8.11.1
Scraping noise or motor blocked	None	Bearing defective	Replacing the motor	See chapter 8.11.1.
		Transmission defective	Replace transmission.	See chapter 8.11.1.
Transmission makes clicking noise	None	Transmission defective	Replace transmission.	See chapter 8.11.1.
		Drive wheel loose	Tighten drive wheel, secure bolts with Loctite if necessary	See chapter 8.10.1.

PROBLEM	OTHER SYMPTOMS	POSSIBLE CAUSE	SOLUTION	Documentation
Transmission losing oil	None	Sealing ring on drive shaft defective	Replace transmission if sealing ring defective.	See chapter 8.11.1.
			Check carbon brushes for oil wetting, replace motor if brushes wet	See chapters 8.11.1 and 8.11.4
Irregular running	None	Drive shaft movable or bent	Check drive shaft, replace transmission if defective.	See chapter 8.11.1.
Parts lost	None	Parts lost	Reattach parts once found.	
Batteries not being charged	None	Fuse burnt out, cable defective	Check cabling and replace fuse	See chapters 8.6 and 8.5
		Batteries defective	Replace batteries	See chapter 8.4.2.
	LEDs blinking on charging unit	Charging unit defective	Replace charging unit	See charging unit operating manual
Short charging period	None	One of the batteries could be defective	Replace batteries	See chapter 8.4.2.
Mobility aid runs too slowly	None	Remote defective	Replace remote	See chapter 8.2.1.
		Batteries defective	Replace batteries	See chapter 8.4.2.

PROBLEM	OTHER SYMPTOMS	POSSIBLE CAUSE	SOLUTION	Documentation
Electrical adjustment motor does not react	Remote shows blinking "E"[1] or blink code 2[2] Status diode on lighting/actuator module does not go out even if the remote has been switched off or disconnected	Lighting / actuator module defective	Replace lighting / actuator module	See chapter 8.2.5.
	None	Cable disconnected or damaged	Safeguard cable connection, replace cable if necessary	See chapter 8.6.
		Electrical adjusting motor defective	Check adjusting motor	
		Remote defective	Replace remote	See chapter 8.2.1.

1 Only applies to remote SD24
2 All remotes except SD24

6.2 REM remotes: Error codes and diagnostic codes

The drive electronics can automatically rectify some faults. In this case the status display will stop blinking. Switch the remote on and off again several times. Wait around 5 seconds each time before switching the remote on again. If this does not rectify the fault, determine the cause using the blink codes from the following table.

BLINK CODE	POSSIBLE CAUSE	SOLUTION	DOCUMENTATION
1 x blink	Module defective	Replace defective module	See chapter 8.2.2.
2 x blink	Accessory error (e.g. short-circuit in adjusting motor)	Check accessory connections, check accessory	See chapter 8.6.
	Lifter too high or too low (seat not at driving height)	If the lifter is raised, lower it slowly until the status display stops blinking. If the lifter is too low, raise it slowly until the status display stops blinking. Only drive when the seat is at driving height.	See operating manual
3 x blink	Fault on left-hand motor (M2). Connection loose/defective or motor defective	Check connection plug, check motor	See chapters 8.6 and 7.1
4 x blink	Fault on right-hand motor (M1). Connection loose/defective or motor defective	Check connection plug, check motor	See chapters 8.6 and 7.1
5 x blink	Fault/brake fault on left-hand motor (M2). Connection loose/defective or motor defective	Check connection plug, check motor	See chapters 8.6 and 7.1
6 x blink	Fault/brake fault on right-hand motor (M19. Connection loose/defective or motor defective	Check connection plug, check motor	See chapters 8.6 and 7.1
7 x blink	Completely discharge battery	Pre-charge battery	See operating manual
8 x blink	Battery voltage too high	Switch lighting to low battery voltage Check battery charger	See charging unit operating manual
9 or 10 x blink	Faulty data transmission between modules	Remove electronic modules except for the power module and the remote. Replace the modules one after another in order to ensure which was the one causing the fault.	See chapter 8.2.2.
11 x blink	Drive motors overloaded / overheated	Switch remote on and off / wait if necessary	-
12 x blink	Compatibility problems between modules	Remove incorrect module	See chapter 8.2.2.

6.3 Diagnosis of charging device faults

SYMPTOM	POSSIBLE CAUSE	SOLUTION
No LEDs illuminating on battery charger	Charging device not connected to mains supply.	Ensure that the battery charger has been plugged in.
	No mains supply	Check the mains supply with a voltmeter.
	Defective mains supply cable.	Check the mains supply cable. Replace damaged cables or send the battery charger to Invacare® Service for repair.
	LEDs are burnt out	Send the battery charger to Invacare® Service for repair.
	An internal fuse might be burnt out.	Send the battery charger to Invacare® Service for repair.
Batteries do not charge	Fuse on mobility aid has burnt out.	Check mobility aid fuses. See chapter 8.5.
	Battery charger not connected to mobility aid.	Ensure that the battery charger has been connected to the mobility aid.
	No mains supply	Check the mains supply with a voltmeter.
	Defective mains supply cable.	Check the mains supply cable. Replace damaged cables or send the battery charger to Invacare® Service for repair.
	Battery charger could be defective.	Use a battery charger which you know is working properly to charge the batteries. Send the defective battery charger to Invacare® Service for repair.
	Battery voltage is too low to operate mobility aid.	Replace the batteries. See chapter 8.4.2.

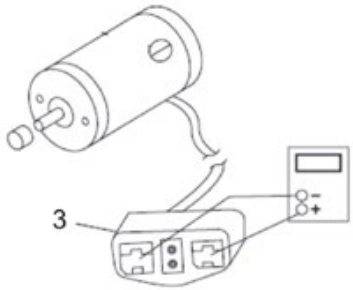
7 Test procedures

7.1 Testing the motor

Requirements:
· digital multimeter with resistance measurement

· Remove the rear panel as described in chapter 8.1.1.

· Pull the motor plug (1) out of the power module.



· Connect the digital multimeter to the motor plug contacts (3) and measure the resistance between the contacts.

Note
A resistance of between 0.5 and 5 ohms indicates a motor ready for operation.

A resistance of between 15 ohms and infinity indicates a defective motor. High resistances are normally caused by bad connections or worn carbon brushes.

7.2 Testing the electro-mechanical parking brake

Note
This test should only be carried out on mobility aids with conventional motor/transmission units.

CAUTION!

Material damage can be caused to the electronics module due to short-circuits in the electro-mechanical brake.

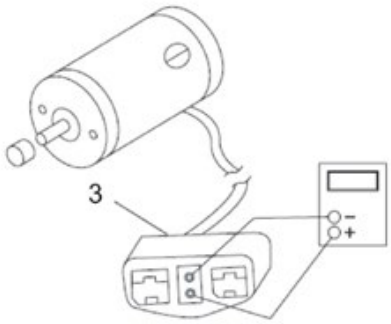
- *NEVER connect an electro-mechanical brake to an intact electronics module with a short-circuit!*
- *Always replace short-circuited brakes immediately.*

Note
A defective motor can damage the power module, but a defective power module cannot camage the motor.

Requirements:
- Phillips screwdriver size 2
- digital multimeter with resistance measurement

- Remove the rear cover as described in chapter 8.1.1.

- Pull the motor plug (1) out of the power module.



- Connect the digital multimeter to the adjacent central motor plug contacts (3) and measure the resistance between the contacts.
- If there is a defect, replace the motor and send it to Invacare® Service for inspection or repair.

Note
A resistance of between 40 and 80 ohms indicates an intact brake.

A resistance of 0 ohms or a very high resistance (mega-ohms or infinity) indicates a short-circuit, a bad connection or a defective brake.

8 Repair work

CAUTION!

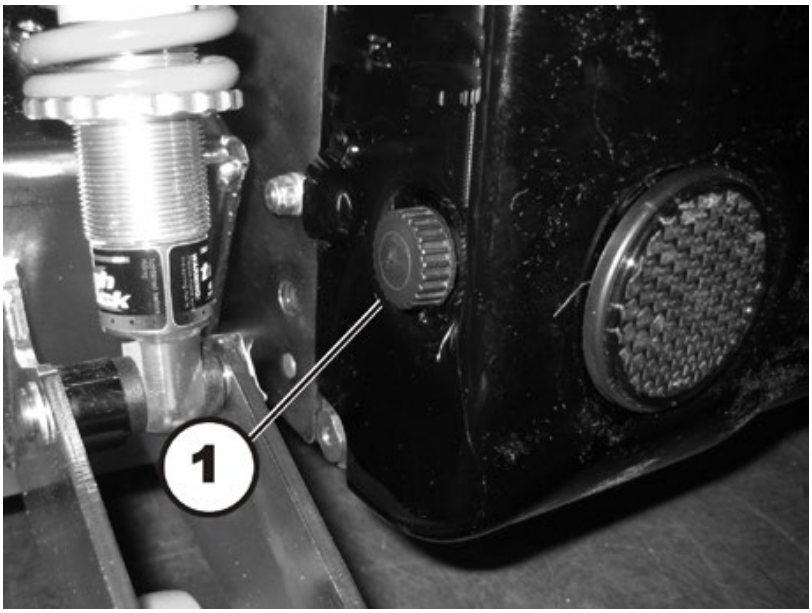
Danger of injury and damage to property, if the maximum speed reduction on a wheelchair with a lifter does not function correctly!

The wheelchair's control unit must reduce the maximum possible speed as soon as the lifter is raised.

- *Test the maximum speed reduction for correct function after any maintenance work or modifications to the wheelchair.*

8.1 Covers

8.1.1 Opening the rear cover panel



Refitting the front cover panel:

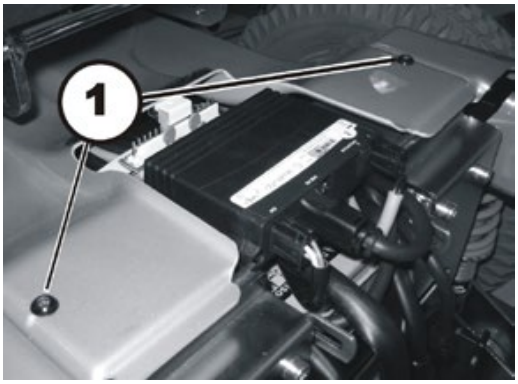
- Loosen and remove the two knurled thumb screws (1) on the left and right side of the rear casing.
- Carefully raise the rear cover. The front part of the cover is held at the top by means of a Velcro ® strip. You must also release this.

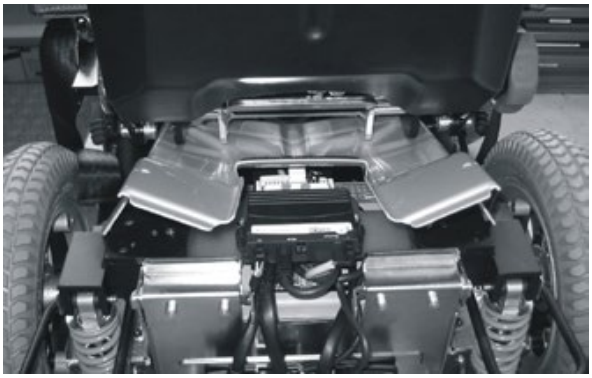
Refitting the rear cover panel:

- Refit the parts in reverse order.
- Tighten the knurled thumb screws hand-tight.

8.1.2 Opening the centre panel

Requirements:
- 4 mm Allen key





Dismantling the centre panel:

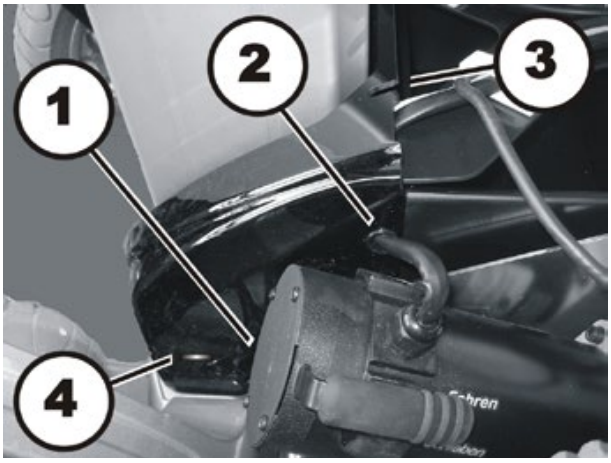
- Remove the rear cover as described in chapter 8.1.1.
- If possible, use the lifter to move the seat to the uppermost position.
- Loosen the two Allen screws (1) using a 4 mm Allen key.
- Lift the rear part of the cover carefully and remove the two spacers that are underneath the cover on the Allen screws.
- Lift off the entire cover. If the mobility aid does not have a lifter, the cover must be bent apart carefully as shown in the picture on the right.

Refitting the centre panel:

- Refit the parts in reverse order.
- Now tighten all the screws finger-tight again.

8.1.3 Opening the front panel

Requirements:
- 4 mm Allen key



Dismantling the front cover panel:

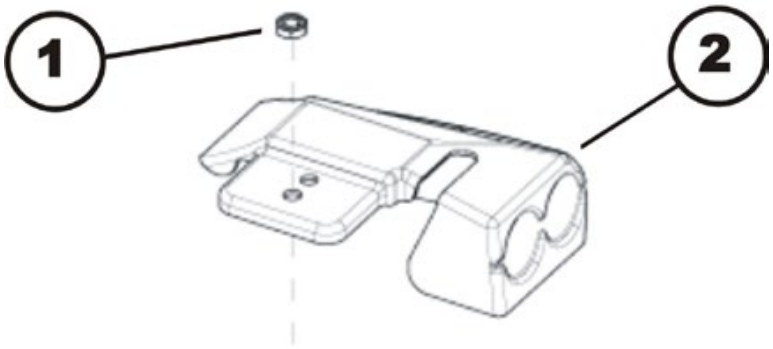
- Use the lifter to move the seat to the uppermost position. If a lifter is not available, you have to remove the seat as described in chapter 8.14.1.1 or 8.14.1.3 respectively.
- Remove the rear and centre cover as described in chapters 8.1.1 and 8.1.2.
- Loosen the two Allen screws (1) – concealed by the motor in the picture – using a 4 mm Allen key.
- Pull the motor cable and the guide bushes (2) out of the lateral recesses.
- Pull the connecting cable to the seat out of the recess (3).
- First lift the front cover up so that the retaining clips (4) are exposed.
- Then pull the cover off towards the front.

Refitting the front panel:

- Refit the parts in reverse order.
- Make sure that the retaining clips (4) snap securely into the openings of the cover.
- Now tighten all the screws finger-tight again.

8.1.4 Opening the rear light cover

Requirements:
- 4 mm Allen key
- socket spanner, 13 mm



Dismantling the rear light cover:

- Remove the rear and centre cover as described in chapters 8.1.1 and 8.1.2.
- Loosen the nut (1) using a 13 mm socket spanner.

Refitting the rear light cover:

- Refit the parts in reverse order.
- Now tighten all the screws finger-tight again.

8.1.5 Replacing a front splash guard

WARNING: Danger of crushing!

The wheelchair is very heavy. Danger of injury to the hands and feet!

- *Use proper lifting techniques.*

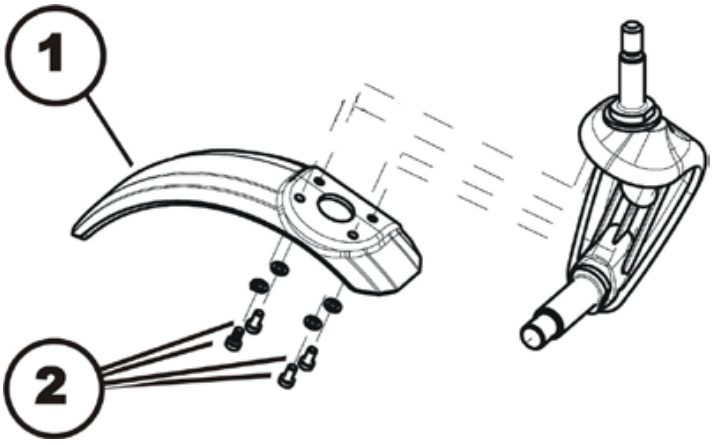
Danger of injury due to uncontrolled movement of the wheelchair!

- *Switch the vehicle's power system off (ON-/OFF key).*
- *Engage the drive motors.*
- *Secure the vehicle against rolling away by placing wedges under the wheels.*

Requirements:

- 4 mm Allen wrench
- 24 mm socket wrench
- 24 mm open-ended wrench
- Flat screwdriver
- Oblong wooden blocks, at least 14 x 14 x 30 cm
- Medium strength thread locking adhesive, for example Loctite 243
- Heat gun

- Lift the wheelchair on one side and place a 14 cm high wooden block underneath it so that the front wheel is off the ground and can rotate freely. Use proper lifting techniques.
- Remove the front wheel, as described in chapter 8.8.1.



Removing the splash guard:

- Loosen and remove the four hexagon socket head screws (2) together with the washers.
- Replace the splash guard (1).

Installing a splash guard:

- Assemble the parts in reverse order.

8.1.6 Replacing the splash guard

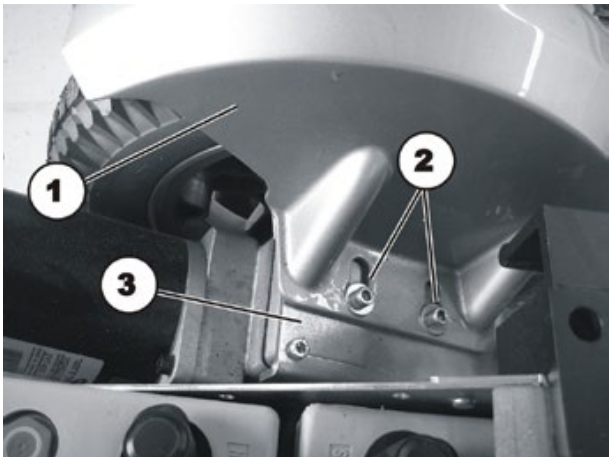
Requirements:
· 5 mm Allen key

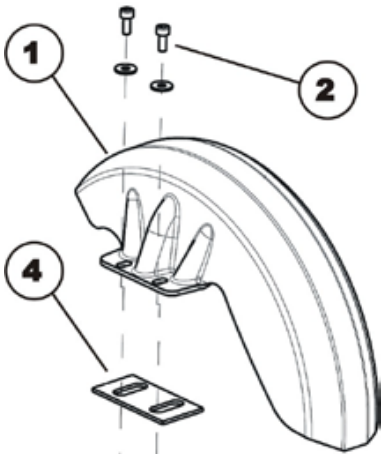
Note
Different splash guards have to be fitted depending on the depth of the seat, the width of the seat and the seat support plates used.

· Use the following table to determine which splash guards have to be used and whether the splashguards possibly have to be replaced.

Seat support	Seat depth in cm	Seat width in cm	Splash guard long RH Order no.: SP1530557	Splash guard long LH Order no.: SP1530558	Splash guard short RH Order no.: SP1530559	Splash guard short RH Order no.: SP1530560
SHORT Order no. 1526437	D=43	W=38	**P**	**P**	O	O
	D=43	W=43	**P**	**P**	O	O
	D=43	W=48	**P**	**P**	O	O
	D=43	W=53	**P**	**P**	O	O
	D=41	W=38	**P**	**P**	O	O
	D=41	W=43	**P**	**P**	O	O
	D=41	W=48	**P**	**P**	O	O
	D=41	W=53	**P**	**P**	O	O
	D=38	W=38	**P**	**P**	O	O
	D=38	W=43	**P**	**P**	O	O
	D=38	W=48	**P**	**P**	O	O
	D=38	W=53	**P**	**P**	O	O
MEDIUM Order no. 1526438	D=48	W=38	**P**	**P**	O	O
	D=48	W=43	**P**	**P**	O	O
	D=48	W=48	**P**	**P**	O	O
	D=48	W=53	O	O	**P**	**P**
	D=46	W=38	**P**	**P**	O	O
	D=46	W=43	**P**	**P**	O	O
	D=46	W=48	**P**	**P**	O	O
	D=46	W=53	O	O	**P**	**P**
	D=43	W=38	**P**	**P**	O	O
	D=43	W=43	**P**	**P**	O	O
	D=43	W=48	**P**	**P**	O	O
	D=43	W=53	O	O	**P**	**P**

Seat support	Seat depth in cm	Seat width in cm	Splash guard long RH Order no.: SP1530557	Splash guard long LH Order no.: SP1530558	Splash guard short RH Order no.: SP1530559	Splash guard short RH Order no.: SP1530560
LONG Order no. 1526439	D=53	W=38	**P**	**P**	O	O
	D=53	W=43	**P**	**P**	O	O
	D=53	W=48	O	O	**P**	**P**
	D=53	W=53	O	O	**P**	**P**
	D=51	W=38	**P**	**P**	O	O
	D=51	W=43	**P**	**P**	O	O
	D=51	W=48	O	O	**P**	**P**
	D=51	W=53	O	O	**P**	**P**
	D=48	W=38	**P**	**P**	O	O
	D=48	W=43	**P**	**P**	O	O
	D=48	W=48	O	O	**P**	**P**
	D=48	W=53	O	O	**P**	**P**
Recaro seat			**P**	**P**	O	O
Optimist seat			O	O	**P**	**P**





Removing the splash guard:

- If possible, move the seat to the uppermost position.
- Loosen and remove the two Allen screws (2) incl. the washers.
- Remove the splash guard (1) from the transmission mounting. (3)
- Only for Storm⁴ X-plore:
  Take care of the spacers (4).
- Replace the splash guard according to the table (see above).

Refitting the splash guard:

- Refit the parts in reverse order.

8.2 Electronics module

8.2.1 Replace remote

Note
Replacing the remote is very easy and is not described in detail.
However, when replacing a remote in connection with the power module, please take the final selection of the drive program into account as described in chapter 8.2.7.

8.2.2 Replacing the power module

Note
When replacing the power module in connection with a remote, please take the final selection of the drive program into account as described in chapter 8.2.7.

Different power modules in connection with different remotes can be fitted to the mobility aid. The possible power modules are described in chapter 4.2.

Replacement is described in the following section based on the example of a mobility aid with an optional lighting PCB and an optional actuator module.

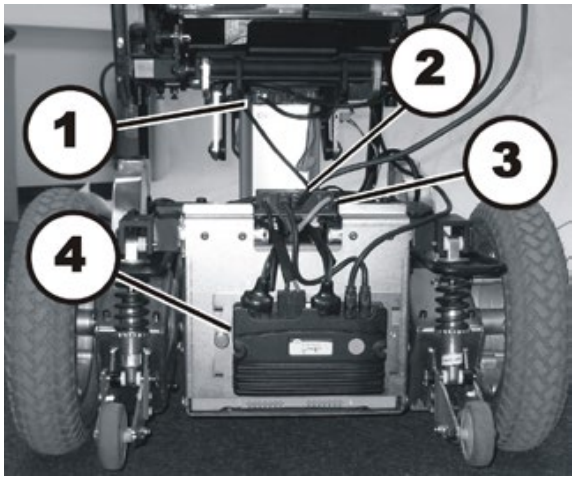
CAUTION!
Any changes to the drive program can affect the driving characteristics and the tipping stability of the mobility aid!
- *Changes to the drive program may only be carried out by trained Invacare® specialist dealers!*
- *Invacare® can only give a warranty for safe mobility aid driving behaviour - especially tipping stability - for unaltered standard drive programs!*

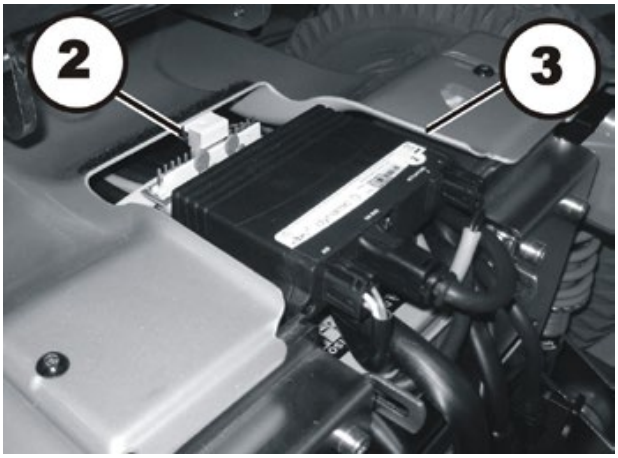
Note
All power modules are delivered with a standard drive program. If you have made any customer-specific modifications to the drive program, these must be adapted after the installation of the new power module.

Requirements:
- 8 mm socket spanner
- To adapt the drive program:
  programming software or hand programming device and system installation manual, available from Invacare®.

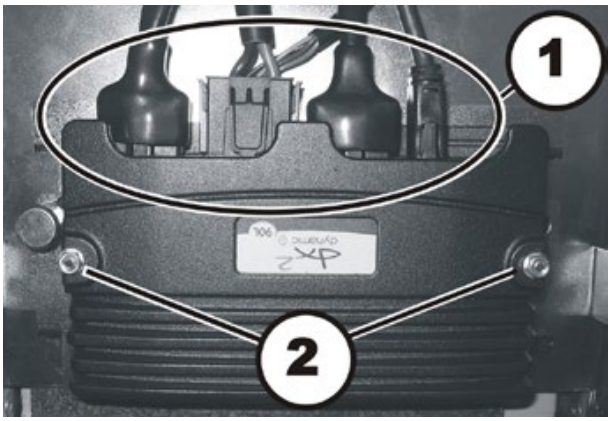
Dismantling the power module:

- Remove the rear panel as described in chapter 8.1.1.





- Carefully note the location of the cable and the connection locations of the various plugs. Either mark each plug and socket, or take a photograph with a digital camera.
- The pictures show the power module (4), the optional lighting PCB (2) and the optional actuator modules (1) & (3).



- Pull the plug (1) out of the power module.
- Loosen the two nuts (2) with a 8 mm socket spanner.
- Remove the power module by pulling it backwards from the guides.
- Replace the power module.

Refitting the power module:

- Refit the parts in reverse order.
- Plug all the plugs into their old positions.
- Select the drive program as described in chapter 8.2.7.
- If a new software version is available, update the drive program as described in chapter 8.3.
- Adapt the drive program using the programming software if necessary.
- To conclude, check all the mobility aid functions.

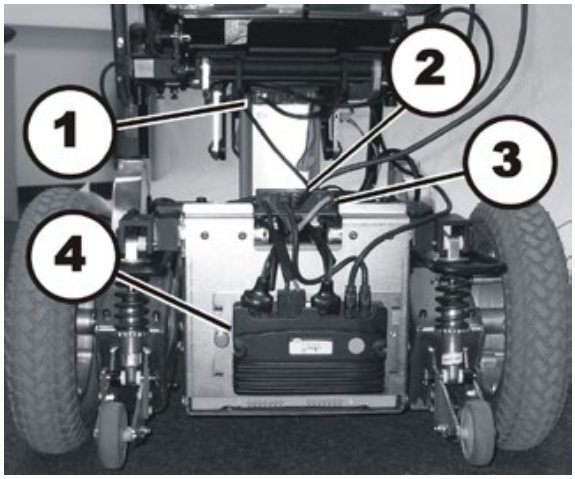
8.2.3 Replacing the actuator module on the battery compartment

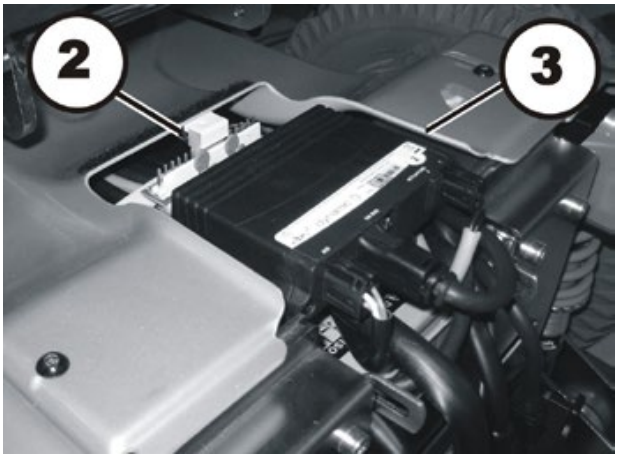
Replacement is described in the following section based on the example of a mobility aid with an optional lighting PCB and an optional actuator module.

Requirements:
- 4 mm Allen key
- Phillips screwdriver size 2

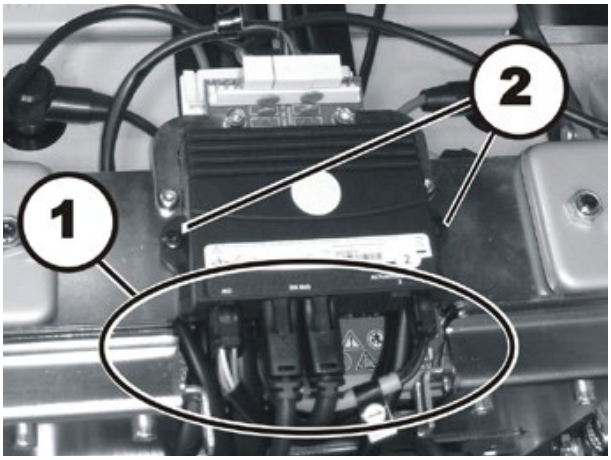
Removing the tilt module:

- If possible, use the lifter to move the seat to the uppermost position.
- Remove the rear and the centre cover as described in chapters 8.1.1 and 8.1.2.





- Carefully note the location of the cable and the connection locations of the various plugs. Either mark each plug and socket, or take a photograph with a digital camera.
- The pictures show the power module (4), the optional lighting PCB (2) and the optional actuator modules (1) & (3).



- Pull the plug (1) out of the actuator module.
- Undo the two Phillips screws (2).
- Replace the actuator module.

Removing the tilt module:

- Refit the parts in reverse order.
- Plug all the plugs into their old positions.
- To conclude, check all the mobility aid functions.

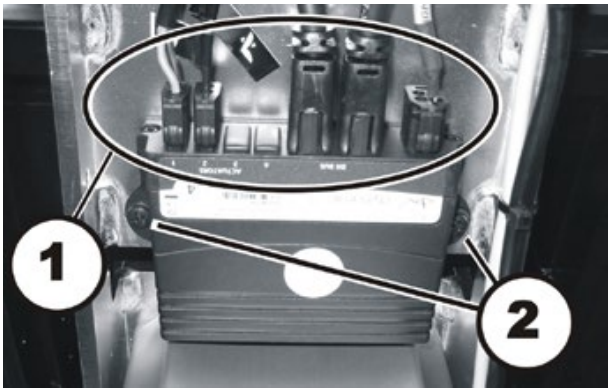
8.2.4 Replacing the actuator module under the seat

The actuator module is optional.

Requirements:
- 4 mm Allen key

Removing the tilt module:

- If possible, use the lifter to move the seat to the uppermost position.
- Carefully note the location of the cable and the connection locations of the various plugs. Either mark each plug and socket, or take a photograph with a digital camera.



- Pull the plug (1) out of the actuator module.
- Remove the two Allen screws (2).
- Replace the actuator module.

Removing the tilt module:

- Refit the parts in reverse order.
- Plug all the plugs into their old positions.
- To conclude, check all the mobility aid functions.

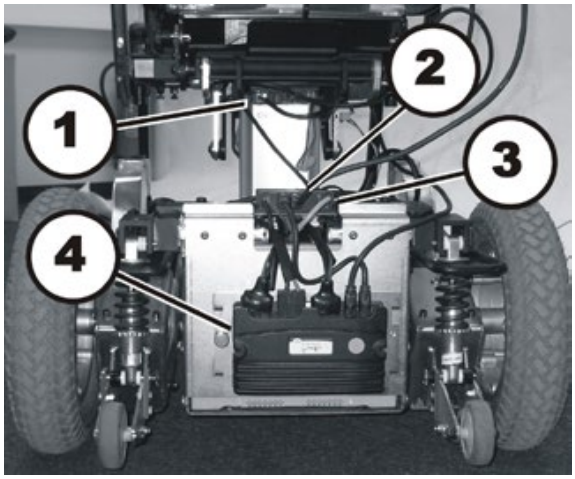
8.2.5 Replacing the lighting PCB

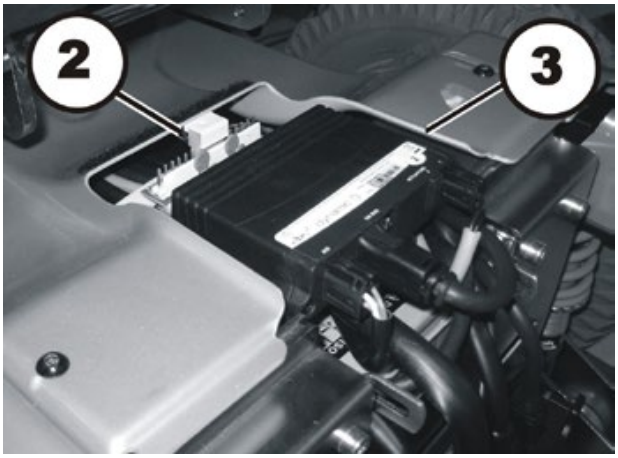
Replacement is described in the following section based on the example of a mobility aid with an optional lighting PCB and an optional actuator module.

Requirements:
- 4 mm Allen key
- 8 mm socket spanner

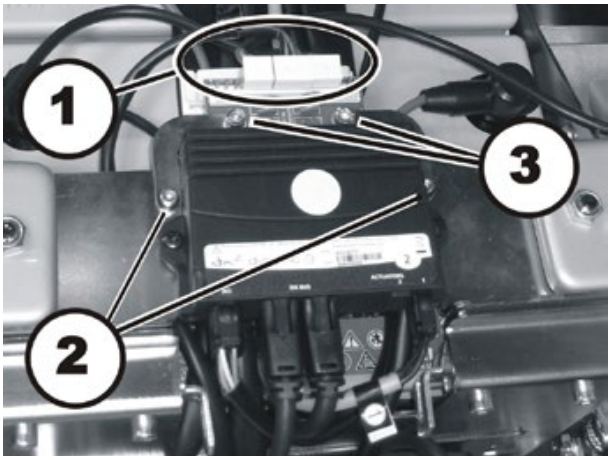
Dismantling the lighting PCB:

- If possible, use the lifter to move the seat to the uppermost position.
- Remove the rear and the centre cover as described in chapters 8.1.1 and 8.1.2.





- Carefully note the location of the cable and the connection locations of the various plugs. Either mark each plug and socket, or take a photograph with a digital camera.
- The pictures show the power module (4), the optional lighting PCB (2) and the optional actuator modules (1) & (3).



- Pull the plug (1) out of the lighting PCB.
- Undo the two Allen screws (2) with a 4 mm Allen key.
- Lift off the lighting PCB together with the retaining bracket.

- Loosen the two Allen screws (3) and the corresponding nuts on the rear using a 4 mm Allen key and an 8 mm socket spanner.
- Replace the lighting PCB.

Refitting the lighting PCB:

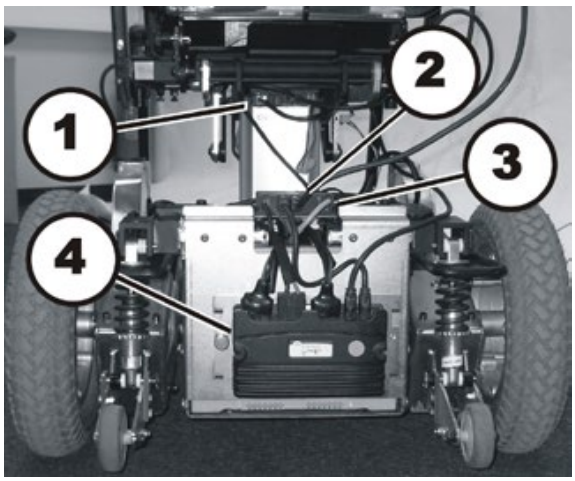
- Refit the parts in reverse order.
- Plug all the plugs into their old positions.
- To conclude, check all the mobility aid functions.

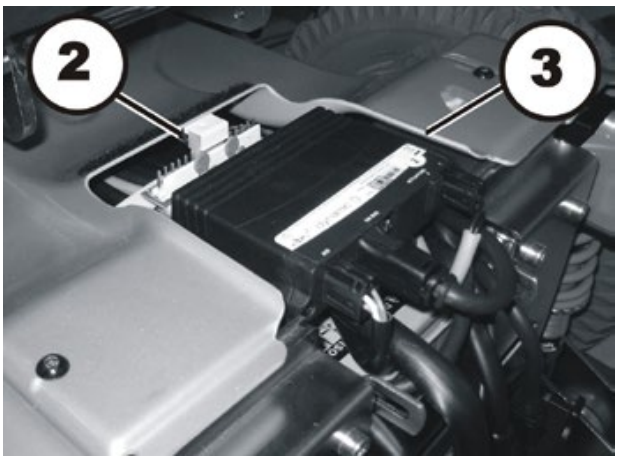
8.2.6 Replacing the G-Trac sensor

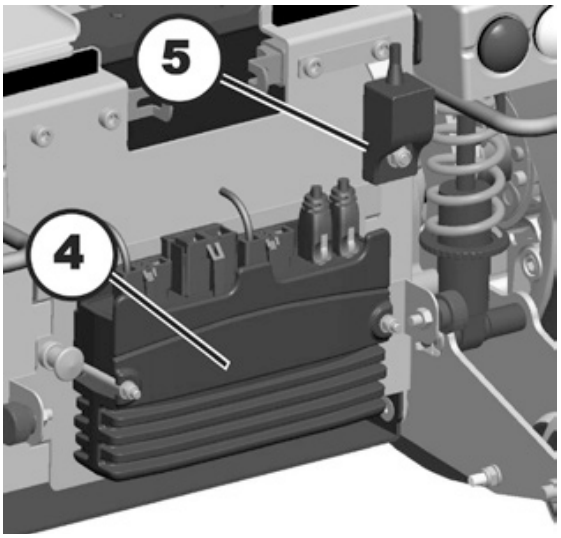
Requirements:
- 5 mm Allen key
- 10 mm socket wrench

Uninstalling the G-Trac sensor:

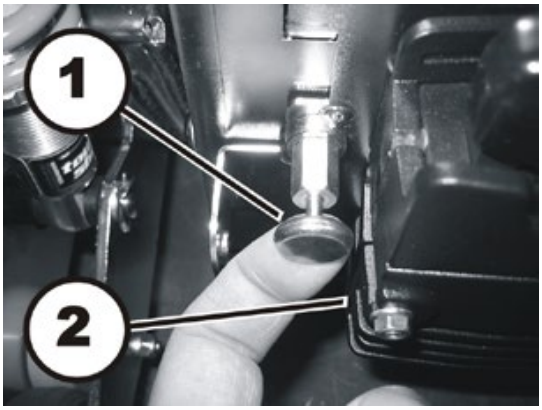
- If possible, completely raise the seat with the lifter.
- Switch the electronics of the wheelchair OFF.
- Remove the rear cover, as described in chapter 8.1.1.

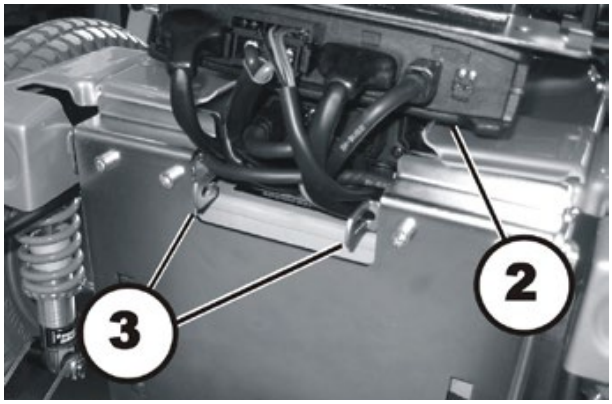




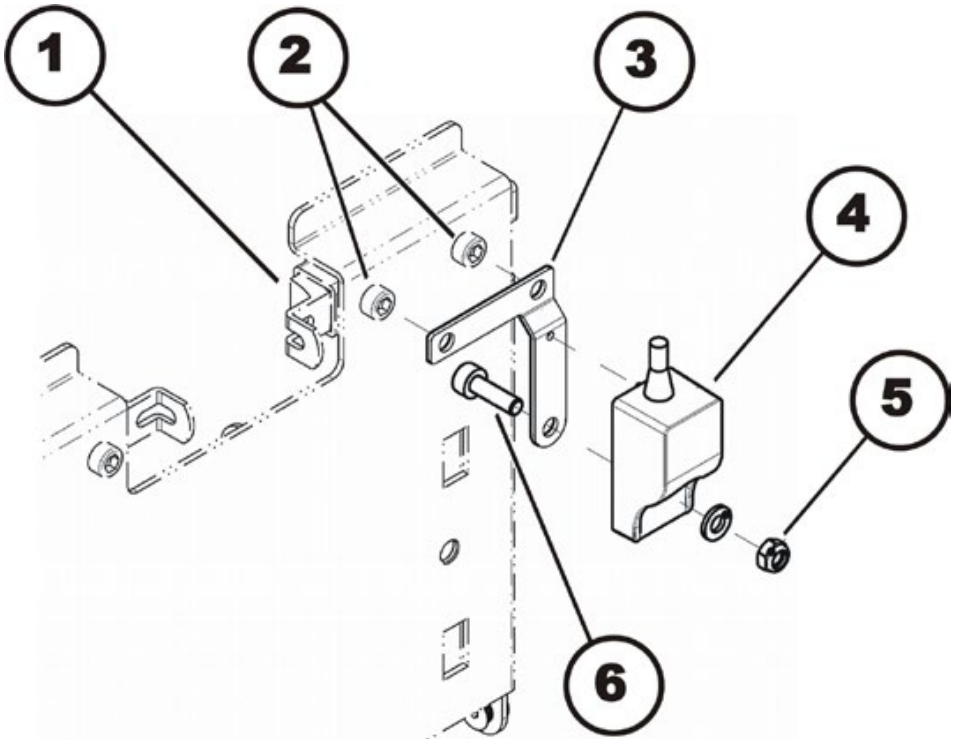


- Take note of the positions of all cables and the sockets that they are connected to. Mark the connectors and sockets or take a photograph with a digital camera.
- In the illustrations you see the power module (4), the optional lighting circuit board (2), the optional actuator module (1) & (3) as well as the G-Trac sensor (5)





- Pull the locking pin (1) that is located next to the power module backwards.
- Lift the power module up, together with the bracket, and remove the bracket from the battery compartment cover.
- Place the power module, together with bracket, on top of the battery box or the actuator module, if installed.
- Press both catches (3) inwards and open the battery box cover.



- Use the 5 mm Allen key to loosen and remove both screws (2).
- Remove the safety catch (1) and the G-Trac bracket (3).
- Loosen and remove the self-locking nut (5) including the washer with a 5 mm Allen key and a 10 mm socket wrench.
- Remove the G-Trac sensor.
- Disconnect the cable of the G-Trac sensor from the electronics module.
- Replace the G-Trac sensor.

Installing the G-Trac sensor:

- Assemble the parts in reverse order.
- Reconnect all cable connectors to their former positions.
- The G-Trac sensor must be installed with the cable pointing upwards. The module has a guide that must fit exactly into the G-Trac sensor holder.
- Test all functions of the vehicle.

8.2.7 Drive program selection after component replacement

The drive program is saved in the remote and in the power module. If one of these two components is replaced, the system must be told which of the components has not been replaced so that it knows which contains the current controller profile.

Note
The system allows normal usage of the mobility aid after component replacement only if the profile is selected afterwards.

8.2.7.1 Profile selection with remote REM A or REM B

- Insert the plug into the remote or into the power module respectively.
- Switch the remote on.
- LEDs (1) and (4) blink.
- Use the bottom rocker switch (5) to select where the required controller profile is saved.
  LED 1 = power module
  LED 4 = remote

  Only LED (1) or (4) blinks now depending on the selection.
- Press the "Horn“ (2) and "+“ (3) buttons on the speed selection and hold them down for 3 seconds to confirm the selection.

  The system will switch itself off and restart automatically. In the process, the selected profile is saved in the remote and in the power module.

8.2.7.2 Profile selection with remote REM 550

- Insert the plug into the remote or into the power module respectively.
- Switch the remote on.

The display (2) shows that you need to select a profile.

- Use the bottom rocker switch (3) to select where the required controller profile is saved.
  I = remote
  II = power module

The display shows which profile you have selected.

- Press the "Horn“ (4) and "+“ (1) buttons on the speed selection and hold them down for 3 seconds to confirm the selection.

The system will switch itself off and restart automatically. In the process, the selected profile is saved in the remote and in the power module.

8.3 Updating the driving program

The driving programs for electric wheelchairs are continually updated and improved by Invacare®. For this reason, you should check whether the version number is still up to date each time a wheelchair comes in for repairs, and also during regular inspections.

If a newer version is available, the driving program must be updated. The procedure for updating the driving program is described in the user manual of the Wizard software.

Note
The electronic system is supplied with a standard drive program. If the driving program has been customised, you have to perform this customisation again, after installing the new driving program. This also applies to the customer-specific options of the seat setting for ACS 2 remotes, which are activated ex works.

WARNING: Every alteration to the drive program can influence vehicle handling and the tipping stability of the wheelchair!

- *Alterations to the drive program must only be carried out by trained Invacare®-dealers!*
- *Invacare® can only assume a warranty for the safe vehicle handling of the wheelchair – in particular tipping stability - for unaltered standard drive programs!*

Pre-requisites:
- Dynamic® Wizard software
- User manual for the Wizard software
- For further information on other requirements - such as the minimum system configuration of the PC to be used for programming, necessary programming cables - see the user manual of the Wizard software. You find the latest version of the user manual in the download area on http://www.dynamiccontrols.com/.

Note
When an electrical adjustment option is retrofitted, such as electrical legrests, then this option needs to be activated in the driving program as well if you have an ACS 2 remote. For more information, refer to the user manual of the Wizard software and the installation instructions for the electronic modules

8.4 Batteries, cables & battery charger

8.4.1 Making the batteries accessible

ATTENTION:

Injury hazard and possible material damages if batteries are handled improperly!

- *The installation of new batteries may only be carried out by authorised specialists.*
- *Observe the warning information on the batteries.*
- *Only use battery versions stated in the specifications.*

ATTENTION:

Fire and burns hazard if battery terminal is bypassed!

- *Please take great care to ensure that the battery terminals are never short-circuited with tools or mechanical mobility device parts!*
- *Ensure that the battery terminal caps have been replaced if you are not working on the battery terminals.*

ATTENTION: Danger of crushing!

The batteries are extremely heavy. This results in injury hazards to your hands.

- *Bear in mind that the batteries are sometimes very heavy!*
- *Please handle the batteries with care.*

WARNING: BURN HAZARD!

Injury hazard due to discharged acid.

- *Always wear acid-proof protective gloves when handling batteries.*
- *Always wear protective goggles when handling batteries.*

What to do if acid is discharged:

- *Always take clothing which has been soiled by or dipped in acid off immediately!*
- *Rinse any areas of your skin which has come into contact with battery acid off immediately with plenty of water!*

If contact with eyes is made:

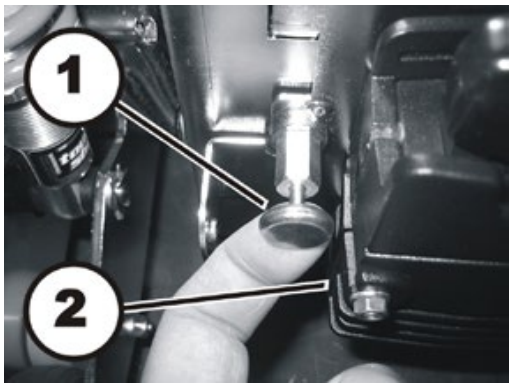
- *Rinse the affected eye under running water for several minutes! You should also consult an eye specialist immediately afterwards!*

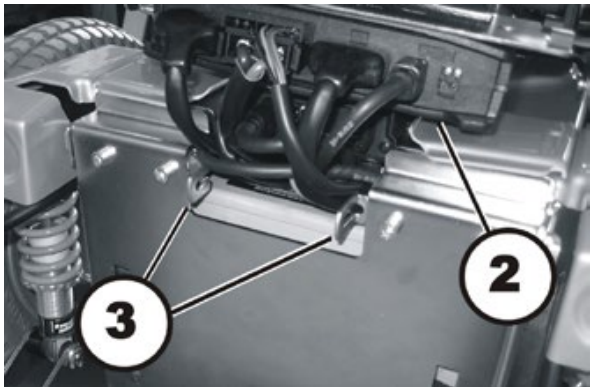
Requirements:

- No tools are required.

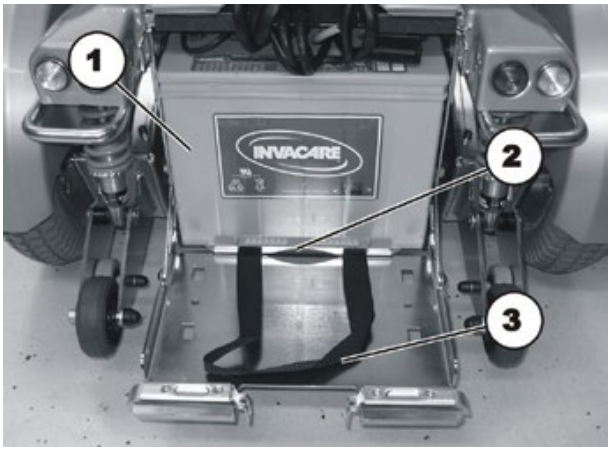
Note

When disassembling, take care of small parts such as screws and washers. Put all small parts down so that they can be reassembled in the right sequence.





- Remove the rear panel as described in chapter 8.1.1.
- Pull back the spring lock (1) next to the power module.
- Raise the power module together with the mounting and remove the mounting from the battery cap flap.
- Place the power module and the mounting on the upper side of the battery compartment or on the actuator module that may possibly exist.
- Press the two lock-out bars (3) inward and open the battery flap.
- Pull on the strap (3) to move the batteries (1) and the battery support (2) forward (see below).



8.4.2 Replacing batteries

ATTENTION:

Injury hazard and possible material damages if batteries are handled improperly!

- *The installation of new batteries may only be carried out by authorised specialists.*
- *Observe the warning information on the batteries.*
- *Only use battery versions stated in the specifications.*

ATTENTION:

Fire and burns hazard if battery terminal is bypassed!

- *Please take great care to ensure that the battery terminals are never short-circuited with tools or mechanical mobility device parts!*
- *Ensure that the battery terminal caps have been replaced if you are not working on the battery terminals.*

ATTENTION: Danger of crushing!

The batteries are extremely heavy. This results in injury hazards to your hands.

- *Bear in mind that the batteries are sometimes very heavy!*
- *Please handle the batteries with care.*

WARNING: BURN HAZARD!

Injury hazard due to discharged acid.

- *Always wear acid-proof protective gloves when handling batteries.*
- *Always wear protective goggles when handling batteries.*

What to do if acid is discharged:

- *Always take clothing which has been soiled by or dipped in acid off immediately!*
- *Rinse any areas of your skin which has come into contact with battery acid off immediately with plenty of water!*

If contact with eyes is made:

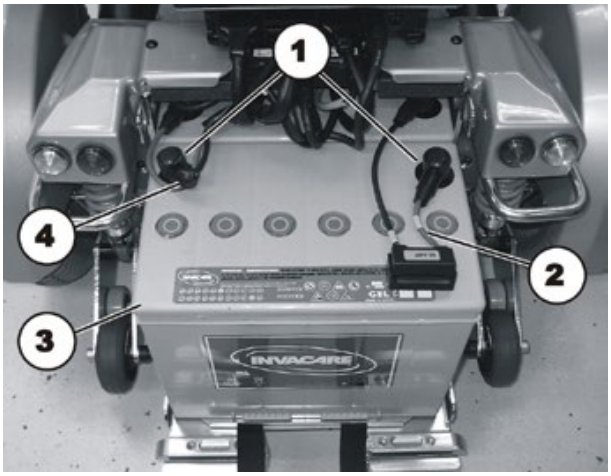
- *Rinse the affected eye under running water for several minutes! You should also consult an eye specialist immediately afterwards!*

Requirements:

- 11 mm socket spanner

Removing the batteries:

- Make the batteries accessible as described in chapter 8.4.1.



- Remove the pole caps (1) on the accessible battery (3).
- Remove the pole screws located under the pole caps using an 11 mm socket spanner.
- Remove the connecting cable (4) and the fuse cable (2).
- Lift the battery from the battery carrier.
- Pull on the strap of the second battery to move it forward.
- Dismantle the cables on the second battery as well.
- Lift the second battery from the battery carrier.

Refitting the batteries:

- Refit the batteries in reverse order.
- Ensure that the battery cage sockets/plugs have been correctly refitted. A polarity diagram is located in the rear cover.

8.4.3 Correct handling of damaged batteries

WARNING: BURN HAZARD!

Injury hazard due to discharged acid.

- *Always wear acid-proof protective gloves when handling batteries.*
- *Always wear protective goggles when handling batteries.*

What to do if acid is discharged:

- *Always take clothing which has been soiled by or dipped in acid off immediately!*
- *Rinse any areas of your skin which has come into contact with battery acid off immediately with plenty of water!*

If contact with eyes is made:

- *Rinse the affected eye under running water for several minutes! You should also consult an eye specialist immediately afterwards!*

Requirements:

- protective goggles
- acid-proof gloves
- acid-proof transport container

- If handling damaged batteries, always wear suitable protective clothing.
- Always deposit damaged batteries in suitable acid-proof containers immediately after removal.
- Only transport damaged batteries in suitable acid-proof containers.
- Always wash any objects which were contacted by acid in plenty of fresh water.

Always dispose of used or damaged batteries correctly

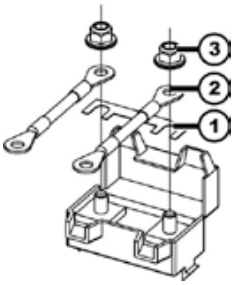
Used and damaged batteries will be taken back by your medical equipment supplier or Invacare®.

8.5 Checking and replacing the main fuse

CAUTION: Fire hazard!
- *Always use an original strip fuse with the approved amperage.*
- *If the main fuse has blown, first rectify the cause before fitting a new one.*

CAUTION: Fire hazard!

Fitting the incorrect strip fuse causes a fire hazard!
- *Only fix the strip fuses in the sequence shown in the image on the right!*
- *Tighten the nuts with 3.3 or 3.5 Nm!*



1. Strip fuse

2. Spade terminal

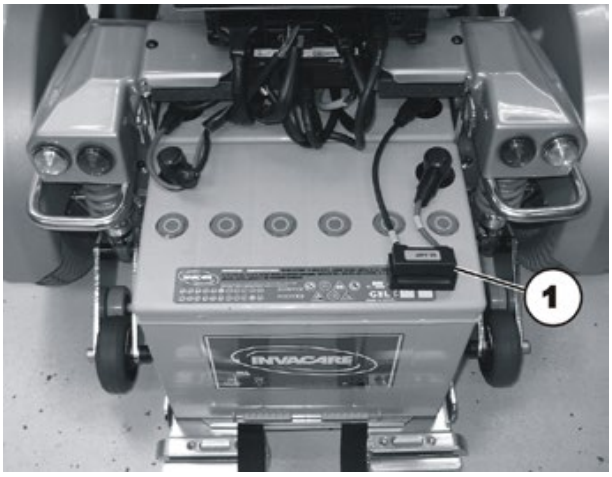
3. DIN 6923 nut

Requirements:
- 8 mm socket spanner

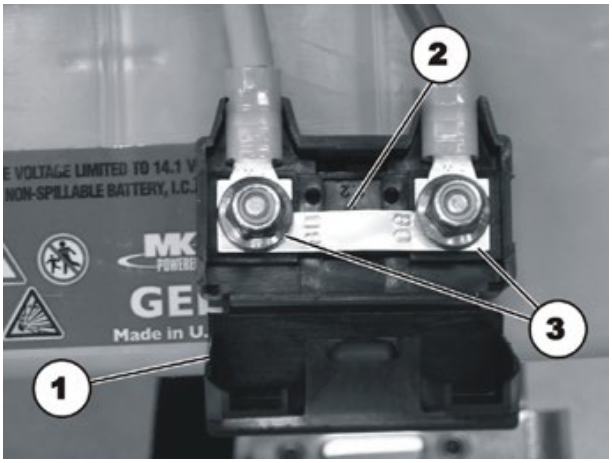
Note
If the fuseholder is damaged, you can replace this complete with the battery cables.

Dismantling the main fuse:

- Remove the battery compartment cover, disconnect the battery plugs and pull the batteries out of the battery compartment as described in chapter 8.4.1.



- The fuseholder (1) is located on top of the batterie.
- Open the fuseholder cover.



- You see the strip fuses (2) once the fuse holder (1) is open.
- If the strip fuse has blown, you must first ascertain and rectify the cause of the fault.
- The main fuse may only be replaced once the fault has been rectified.
- Remove the strip fuse nuts (3) with an 8 mm socket spanner.
- Replace the strip fuse.

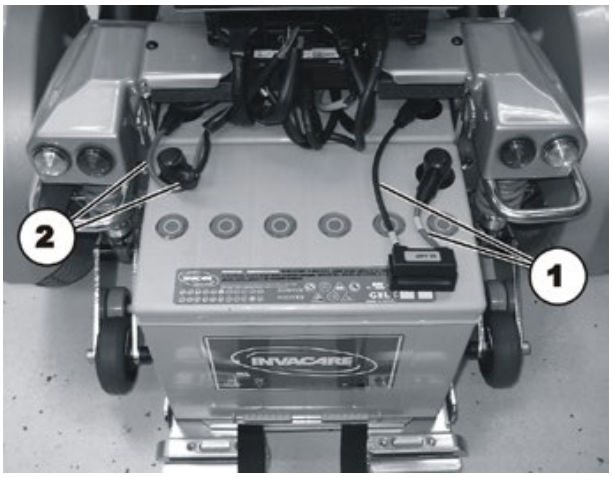
Fitting the main fuse:

- Refit all the parts again in reverse order.
- To conclude, check all the mobility aid functions.

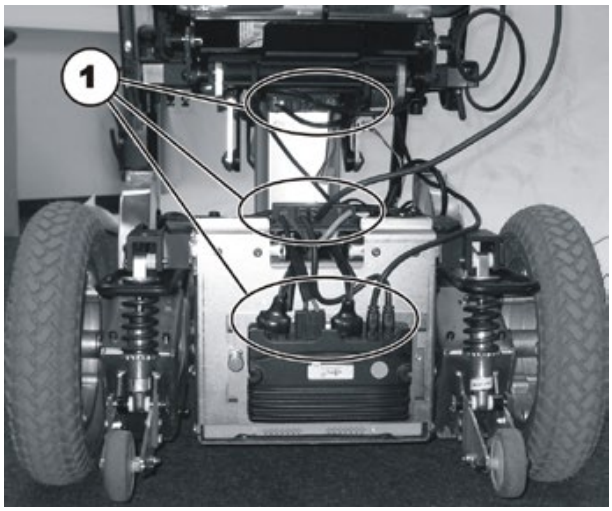
8.6 Checking the cable

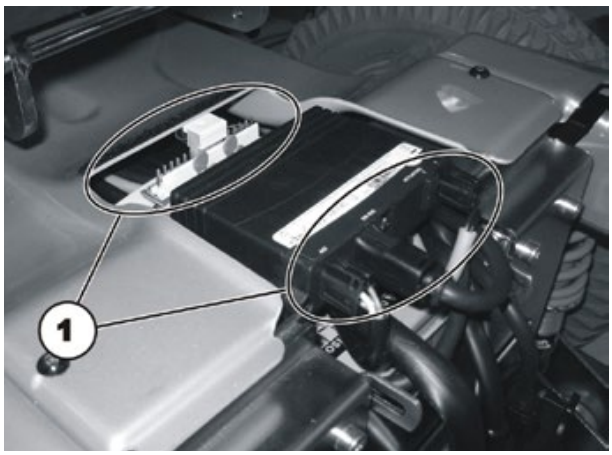
Requirements:
- 4 mm Allen key
- oblique pliers
- cable ties

- Remove the rear and the centre cover as described in chapters 8.1.1 and 8.1.2.
- Pull the batteries out of the battery compartment as described in chapter 8.4.1.



- Check the fuse cable (1) and battery cable (2) for visible damage and crushing points.
- Replace any damaged cables.





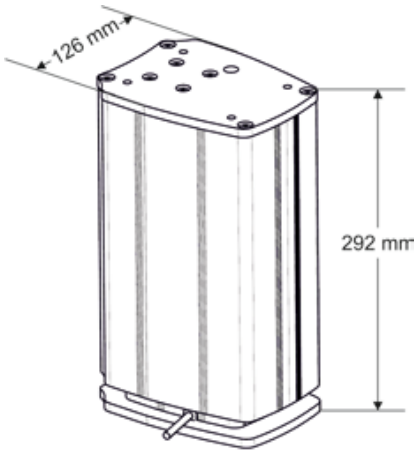
- Check all cables for visible damage and crushing locations. Replace any damaged cables.
- Pull each plug (1) carefully. The plug should not come out of the socket.
- If one of the plugs is loose, press it back into the socket with light pressure. The plug must engage.

- Checked to ensure that the plug is now firmly in its socket. If not, repeat the previous operation.
- Refit the parts in reverse order.
- Check all vehicle functions.

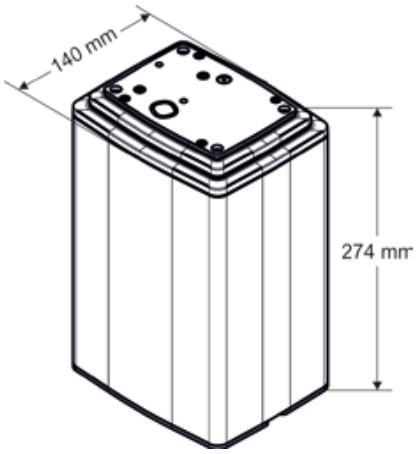
8.6.1 Installing cables

Note
Pay attention to chapter 8.6.2 if a type B lifter column is installed.

Lifter column type A
electrically adjustable

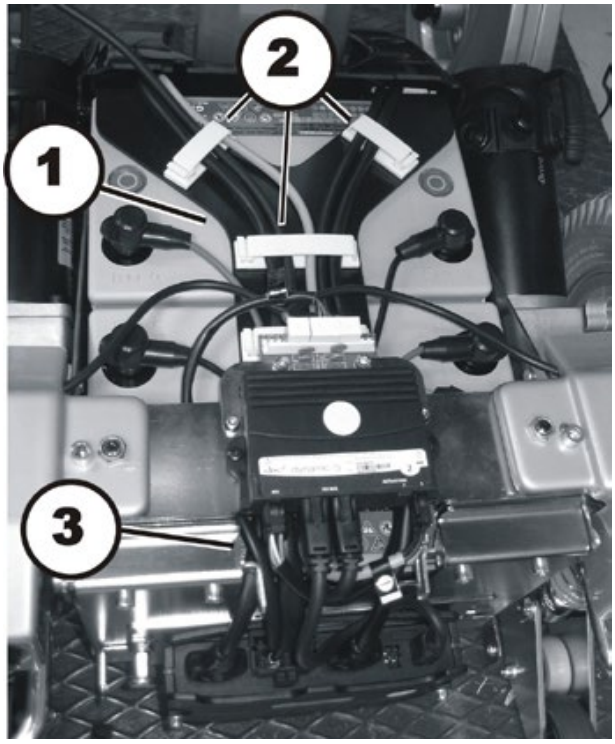


Lifter column type B
electrically adjustable

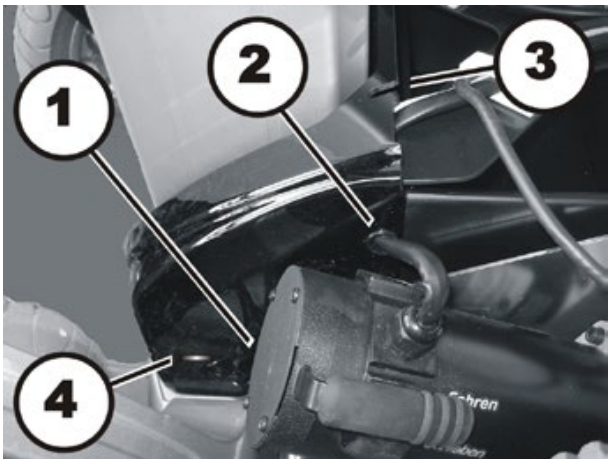


Requirements:
- 4 mm Allen key
- oblique pliers
- cable ties

- Remove the rear and the centre cover as described in chapters 8.1.1 and 8.1.2 .
- In the case of the lifter cabling, also remove the front cover as described in chapter 8.1.3.



- Lead the cables on the modules fitted at the rear (power module and actuator module) through the recess in the battery flap under the actuator module to the cable bridge (1).
- Lead the cables inside the covers over the cable bridge (1).
- Fasten the cables with the cable clamps (2). The cable clamps on the front side of the battery compartment for the cables of the optional lifter are not seen in the picture.

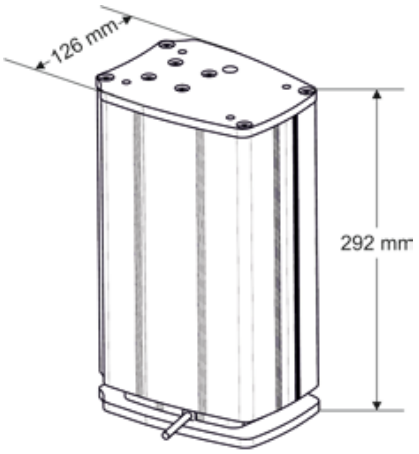


- The motor cables are fitted with protection covers (2) and are guided out of the front cover through recesses on the side.
- Cables that lead to the seat (upper actuator module, remote, headlight), are guided out of the front cover through an upper left recess (3).
- Make sure the cable has enough play so that all movable parts can move freely without stretching, clamping or abrading the cable.
- Lay the cables in the same way under the seat and to the remote. Fasten the cables with the prescribed cable clamps or cable ties respectively.

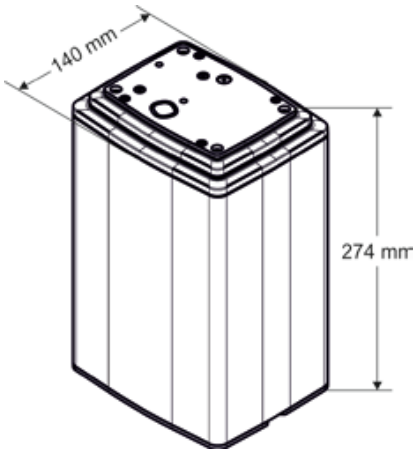
8.6.2 Installing cables on a lifter column type B

If a type B lifter column was already installed, then you can begin directly with chapter 8.6.2.2.

Lifter column type A
electrically adjustable



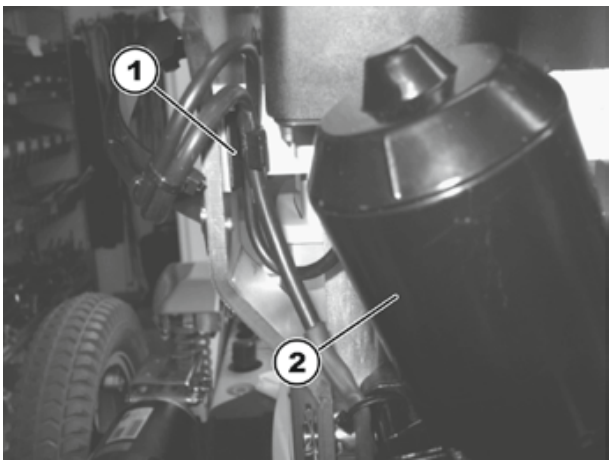
Lifter column type B
electrically adjustable



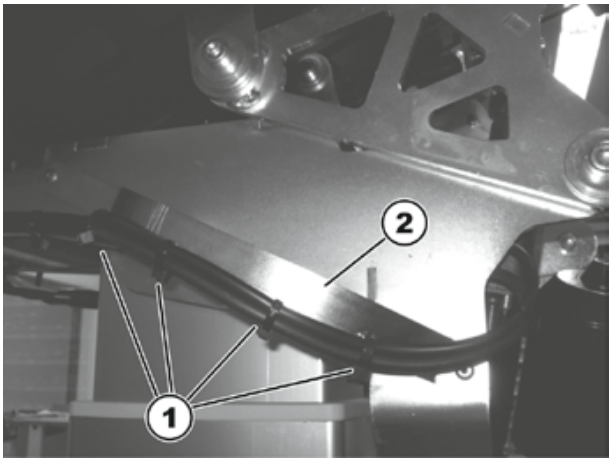
8.6.2.1 Installing cables on a type B lifter column - part 1

Requirements:
- 4 mm Allen wrench
- Side cutting pliers
- Cable ties

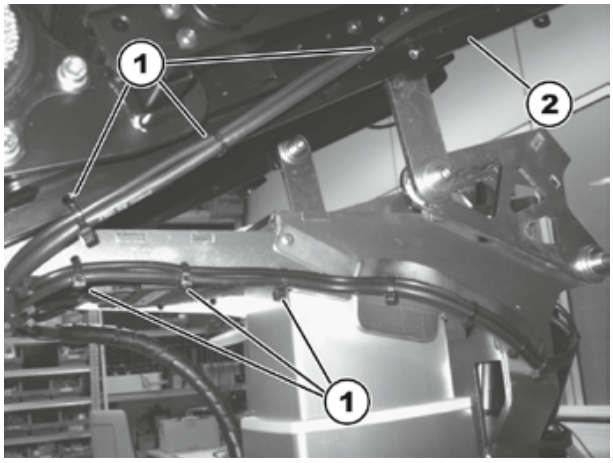
The conduits leading from the battery box to the seat must be installed so that they do not get crimped, stretched or sheared when raising or lowering the seat.



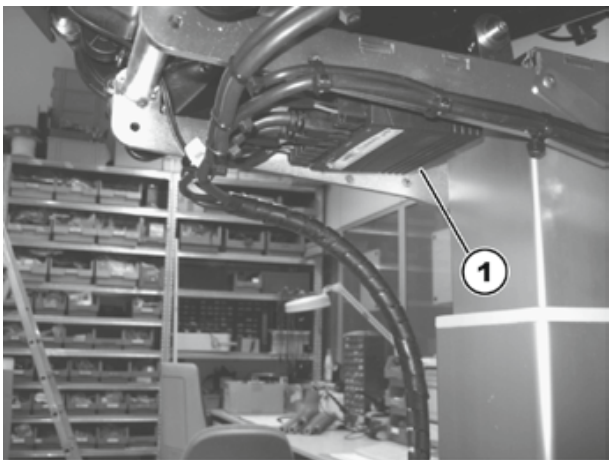
- Run the cables from the actuator (2) of the seat angle adjustment to the cable holder (1).
- Secure the cables with a cable tie.
- Run the conduits further to the lateral bar.



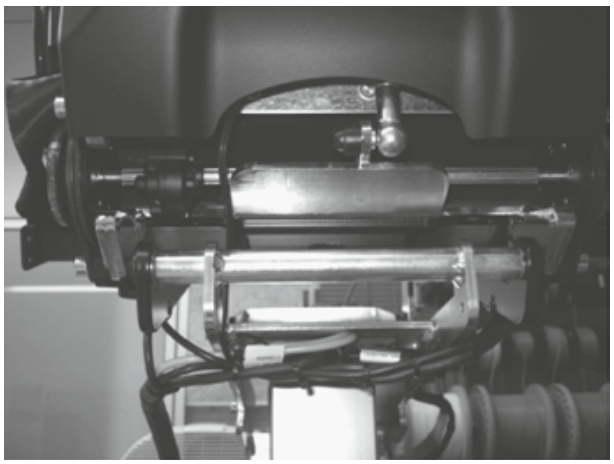
· Secure the cables with a cable tie (1) under the outer side of the bar (2).



· Secure the cables with a cable tie (1) under the outer side of the seat frame (2).



View seat from below with ACT (1).

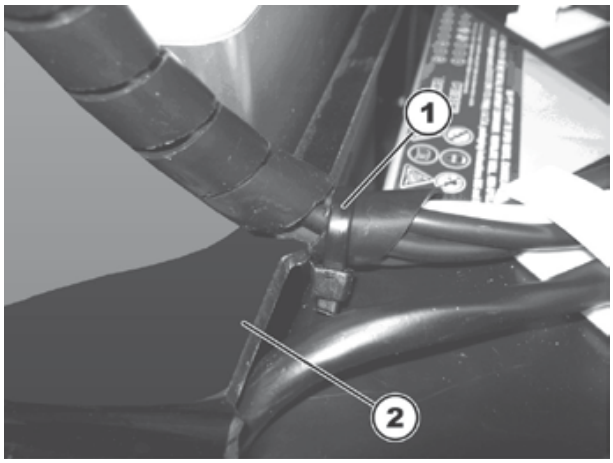


View from the rear

- Attach the cable guide for the lifter (1) using the two supplied hexagon socket head screws, on the left underneath the seat.

- Position the protective tube for the cables completely from the outer side.
- Secure the protective tube with a cable tie (1) on the cable guide.
- Proceed with the following chapter 8.6.2.2.

8.6.2.2 Installing cables on a type B lifter column - part 2



- Run the cable bundle, including the protective tube for the cables, through the opening in the front cover (2).
- Secure the cable bundle with a cable tie under the cover.
- Raise and lower the seat several times while closely watching the cable bundle.

The cable bundle must not get trapped, stretched or crushed. The cable bundle must move sideways, as shown in the following illustrations. The drive motor must not be touched by the cable bundle.

Lifter column completely extended.

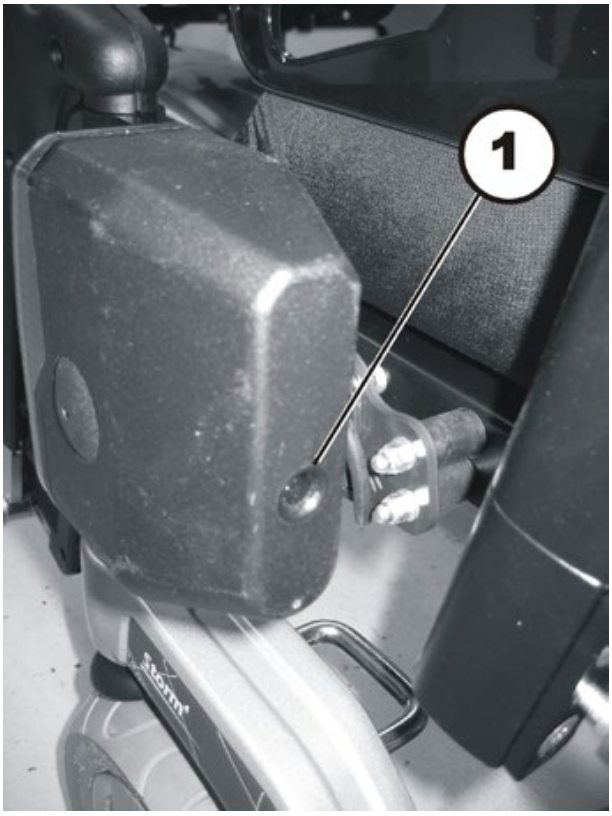
Lifter column completely retracted.
Pay attention to areas where the cable bundle might get crushed or touch the motor.

8.7 Lighting unit

Note
There are two different lighting units. A conventional lighting unit with bulbs and a LED lighting unit.

8.7.1 Replacing the front bulb (conventional lighting unit)

Requirements:
· Phillips screwdriver size 2



· Undo the concealed Phillips screw on the rear of the headlight/indicator combination.
· Remove the transparent plastic cover.
· Replace the defective bulb.
· Close the cover and tighten the Phillips screw finger-tight.

8.7.2 Replacing the front LED (LED lighting unit)

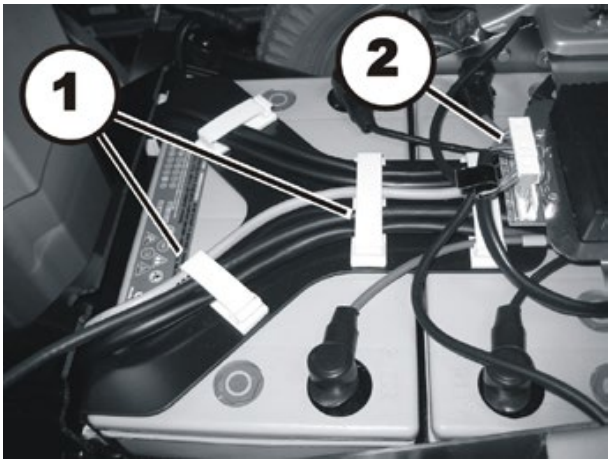
· It is not intended for an individual LED to be replaced. Replace the entire lighting unit as described in chapter 8.7.3.

8.7.3 Replacing the complete front headlight (conventional lighting unit until 03/2012)

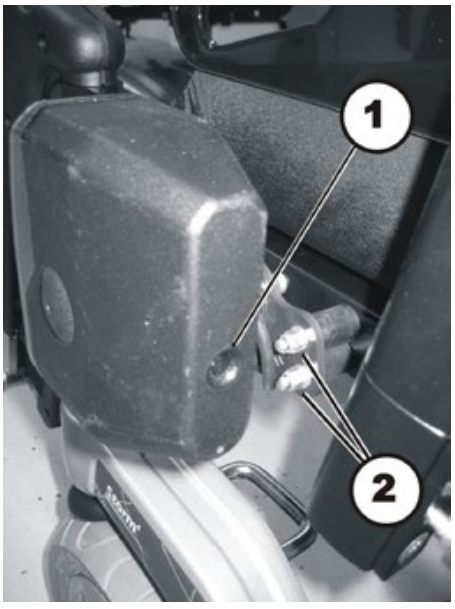
Requirements:
- Phillips screwdriver size 2
- 8 mm spanner
- 4 mm Allen key
- Diagonal pliers
- Cable tie

Removing the front headlight:

- Remove the rear and centre cover as described in chapters 8.1.1 and 8.1.2.



- Carefully note the location of the cable and the connection locations of the various plugs. Either mark each plug and socket, or take a photograph with a digital camera.
- Loosen the cable leading to the lighting PCB from the front headlight affected (2).
- Open the cable clamps (1), remove all cable ties and pull the cable out of the mobility aid.



- Loosen the two cap nuts (2) using an 8 mm spanner and remove the headlight with the mounting from the rubber bumpers.
- There are two Phillips screws, (cannot be seen in the picture), that fasten the headlight to the mounting. Loosen the two Phillips screws in order to remove the headlight from the mounting.
- Replace the headlight unit.

Refitting the front headlight:

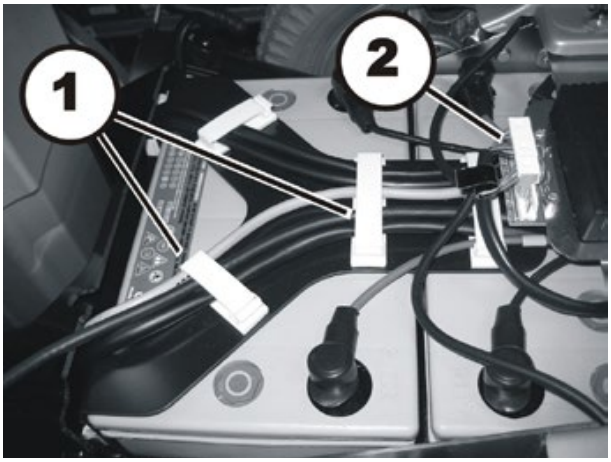
- Refit the parts in reverse order.
- Lay the cables carefully and fasten them using the cable clamps and cable ties. In doing so, please pay attention to chapter 8.6.1.
- Now tighten all the screws finger-tight again.
- Check all vehicle functions.
- Adjust the headlight roughly using the grid. The user can carry out the final adjustment following the operating manual.

8.7.4 Replacing headlamps completely (conventional lighting system starting 03/2012)

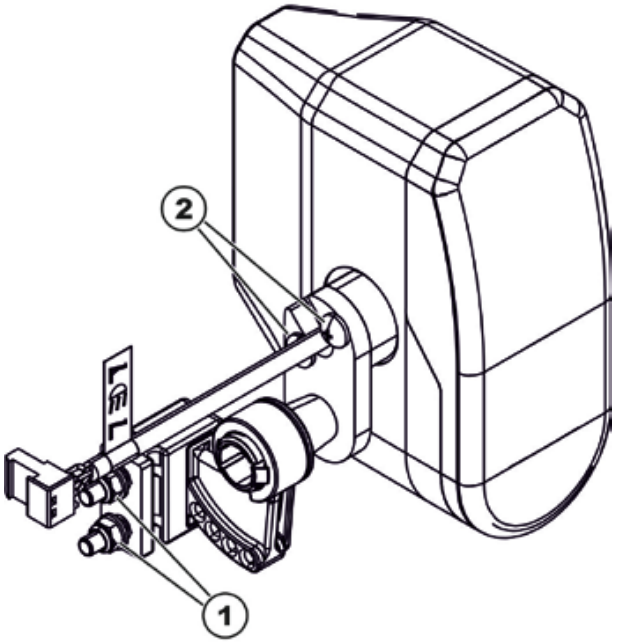
Requirements:
- Phillips screwdriver size 2
- Open-end wrench 8 mm
- Side cutting pliers
- Cable ties

Uninstalling headlights:

- Remove the rear and the middle covers, as described in chapter 8.1.1 and 8.1.2.



- Take exact note of the positions of all cables and the sockets that they are connected to. Mark the connectors and sockets or take a photograph with a digital camera.
- Disconnect the cable of the affected headlight from the lighting circuit board (2).
- Open the cable clamps (1) remove all cable ties and pull the cable out of the wheelchair.



- Loosen both of the nuts (1) with an 8 mm open-end wrench and remove the headlight with the bracket from the rubber mounting.
- Loosen both Phillips head screws (2) to remove the headlight from the bracket.
- Replace the headlight.

Installing headlights:

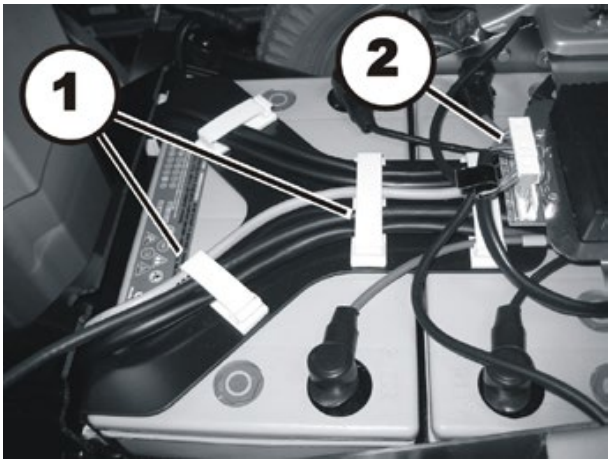
- Assemble all parts again in reverse order.
- Install the cables carefully and secure them with the cable clamps and cable ties. When doing so, pay attention to chapter 8.6.1.
- Tighten the screws hand-tight.
- Check all vehicle functions.
- Perform an approximate adjustment of the headlight using the ratchet plate as a guide. The final adjustment can be performed by the user according to the instructions found in the User Guide.

8.7.5 Replacing the complete front headlight (LED lighting unit)

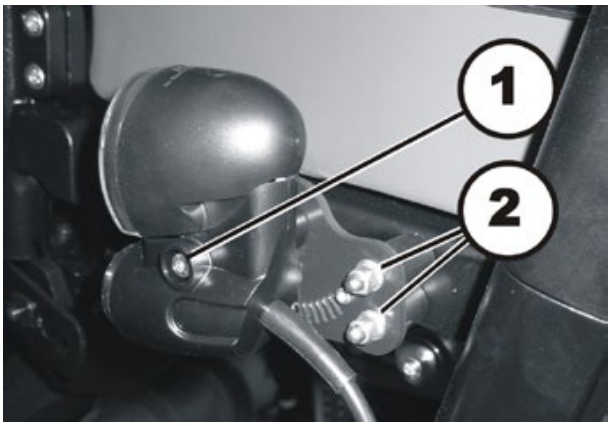
Requirements:
- 8 mm spanner
- 4 mm Allen key
- Diagonal pliers
- Cable ties

Removing the front headlight:

- Remove the rear and centre cover as described in chapters 8.1.1 and 8.1.2.



- Carefully note the location of the cable and the connection locations of the various plugs. Either mark each plug and socket, or take a photograph with a digital camera.
- Loosen the cable leading to the lighting PCB from the front headlight affected (2).
- Open the cable clamps (1), remove all cable ties and pull the cable out of the mobility aid.



- Loosen the Allen screw (1) using a 3 mm Allen key and remove the headlight from the mounting.
- Replace the headlight unit.

Refitting the front headlight:

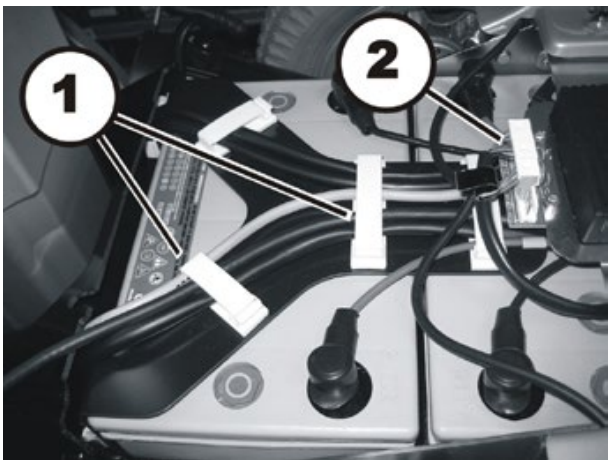
- Refit the parts in reverse order.
- Lay the cables carefully and fasten them using the cable clamps and cable ties. In doing so, please pay attention to chapter 8.6.1.
- Now tighten all the screws finger-tight again.
- Check all vehicle functions.
- Adjust the headlight roughly using the grid. The user can carry out the final adjustment following the operating manual.

8.7.6 Replacing headlamps completely (LED lighting system starting 03/2012)

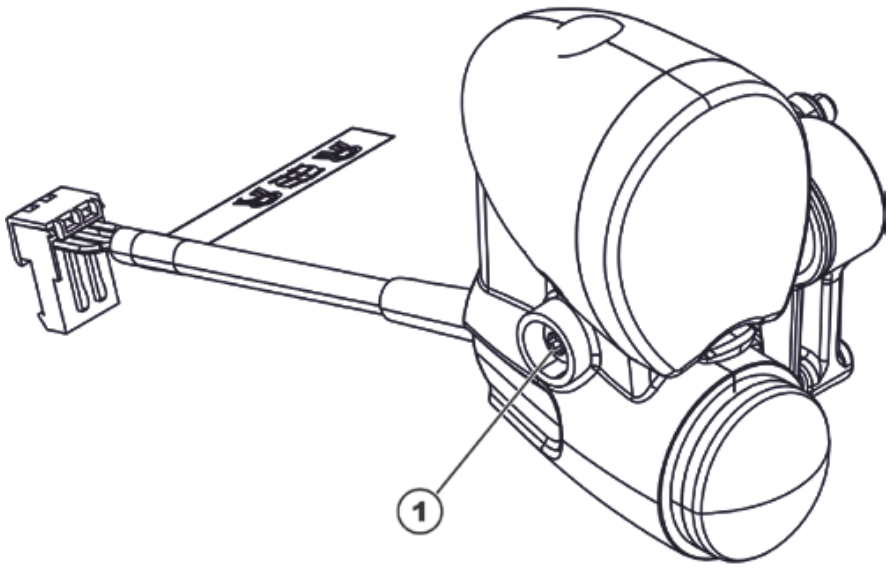
Requirements:
- 4 mm Allen wrench
- Side cutting pliers
- Cable ties

Uninstalling headlights:

- Remove the rear and the middle covers, as described in chapter 8.1.1 and 8.1.2.



- Take exact note of the positions of all cables and the sockets that they are connected to. Mark the connectors and sockets or take a photograph with a digital camera.
- Disconnect the cable of the affected headlight from the lighting circuit board (2).
- Open the cable clamps (1) remove all cable ties and pull the cable out of the wheelchair.



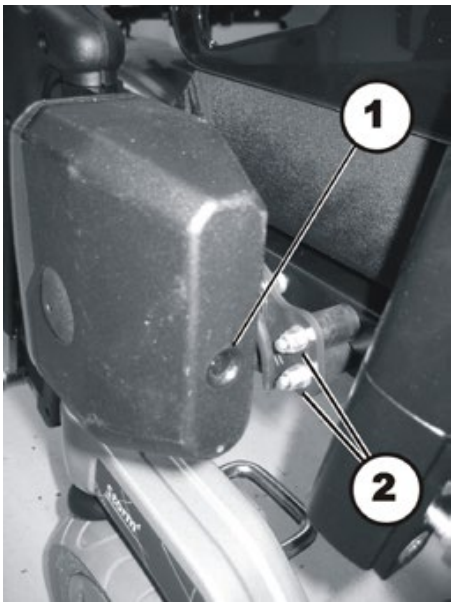
- Loosen the hexagon socket head screw (1) with a 4 mm Allen wrench and remove the headlight from the bracket.
- Replace the headlight.

Installing headlights:

- Assemble all parts again in reverse order.
- Install the cables carefully and secure them with the cable clamps and cable ties. When doing so, pay attention to chapter 8.6.1.
- Tighten the screws hand-tight.
- Check all vehicle functions.
- Perform an approximate adjustment of the headlight using the ratchet plate as a guide. The final adjustment can be performed by the user according to the instructions found in the User Guide.

8.7.7 Replacing the front bulb holder (conventional lighting unit until 03/2012)

Requirements:
- Phillips screwdriver size 2
- 8 mm spanner



Dismantling the bulbholder:

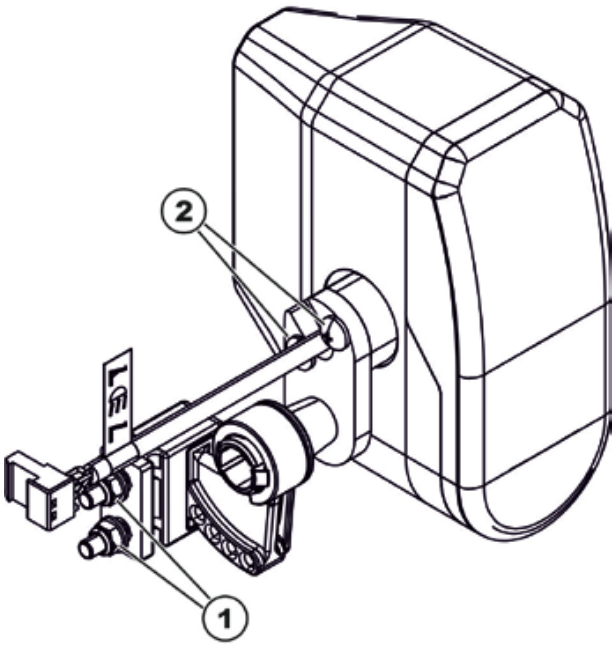
- Loosen the two cap nuts (2) using an 8 mm spanner and remove the headlight with the mounting from the rubber bumpers.
- There are two Phillips screws, (cannot be seen in the picture), that fasten the headlight to the mounting. Loosen the two Phillips screws in order to remove the headlight from the mounting.
- Replace the mounting.

Refitting the bulbholder:

- Refit the parts in reverse order.
- Now tighten all the screws finger-tight again.
- Check all vehicle functions.
- Adjust the headlight roughly using the grid. The user can carry out the final adjustment following the operating manual.

8.7.8 Replacing headlamp brackets (conventional lighting system starting 03/2012)

Requirements:
- Phillips screwdriver size 2
- Open-end wrench 8 mm



Uninstalling the tail light bracket:

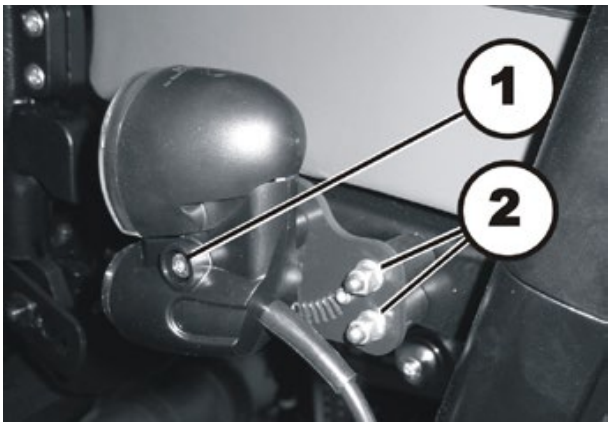
- Loosen both of the nuts (1) with an 8 mm open-end wrench and remove the headlight with the bracket from the rubber mounting.
- Loosen both Phillips head screws (2) to remove the headlight from the bracket.
- Replace the bracket.

Installing the headlight bracket:

- Assemble all parts again in reverse order.
- Tighten the screws hand-tight.
- Check all vehicle functions.
- Perform an approximate adjustment of the headlight using the ratchet plate as a guide. The final adjustment can be performed by the user according to the instructions found in the User Guide.

8.7.9 Replacing the front bulb holder (LED lighting unit until 03/2012)

Requirements:
- 4 mm Allen key
- 8 mm spanner



Dismantling the bulbholder:

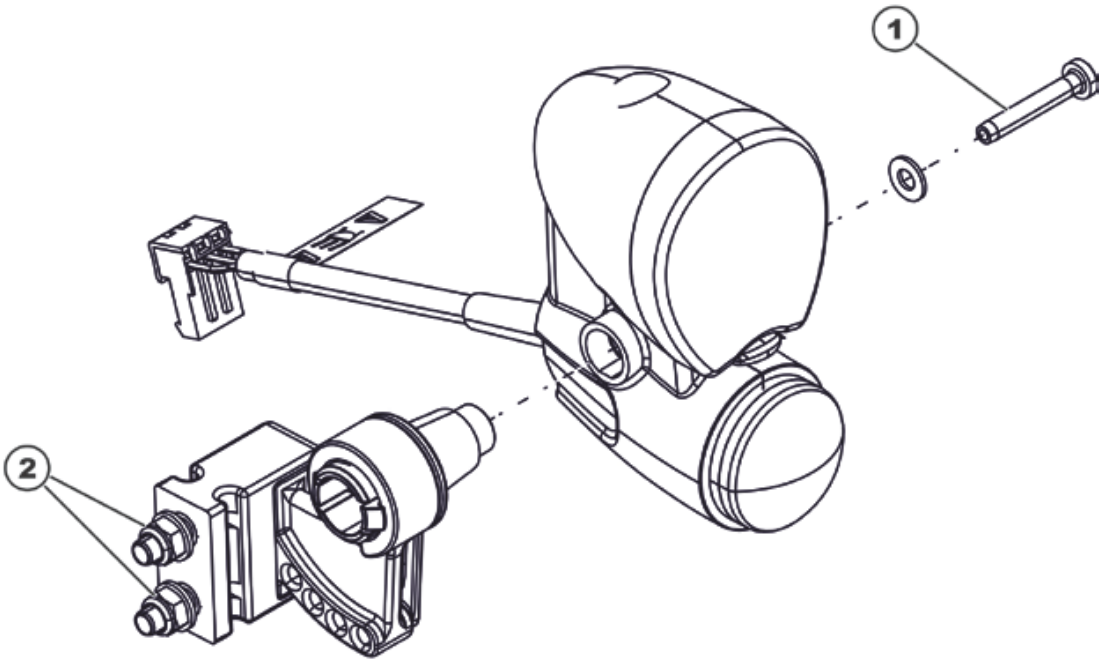
- Loosen the Allen screw (1) using a 4 mm Allen key and remove the headlight from the mounting.
- Loosen the two cap nuts (2) using an 8 mm spanner and remove the headlight with the mounting from the rubber bumpers.
- Replace the mounting.

Refitting the bulbholder:

- Refit the parts in reverse order.
- Now tighten all the screws finger-tight again.
- Check all vehicle functions.
- Adjust the headlight roughly using the grid. The user can carry out the final adjustment following the operating manual.

8.7.10 Replacing headlamp brackets (LED lighting system starting 03/2012)

Requirements:
- 4 mm Allen wrench
- Open-end wrench 8 mm



Uninstalling the tail light bracket:

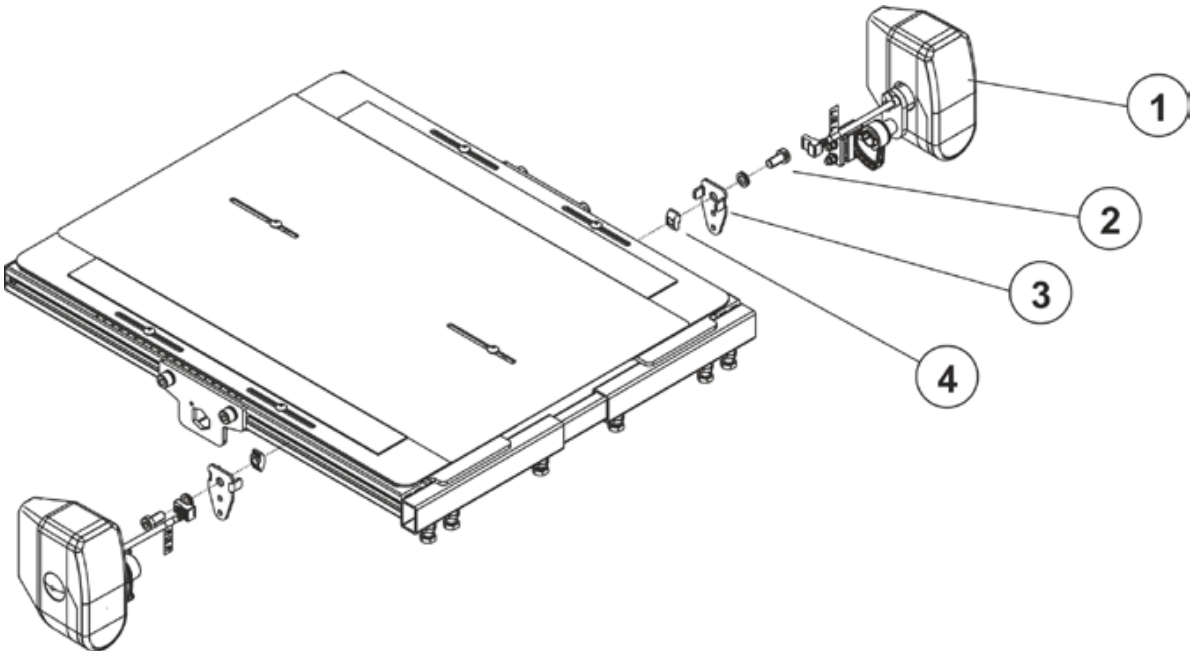
- Loosen the hexagon socket head screw (1) with a 4 mm Allen wrench and remove the headlight from the bracket.
- Loosen both of the nuts (2) with an 8 mm open-end wrench and remove the bracket from the rubber mounting.
- Replace the bracket.

Installing the headlight bracket:

- Assemble all parts again in reverse order.
- Tighten the screws hand-tight.
- Check all vehicle functions.
- Perform an approximate adjustment of the headlight using the ratchet plate as a guide. The final adjustment

8.7.11 Replacing the headlamp holder on the seat profile (Modulite seat)

Requirements:
- Phillips screwdriver size 2
- 8 mm spanner
- 6 mm Allen key



Dismantling the headlamp holder:

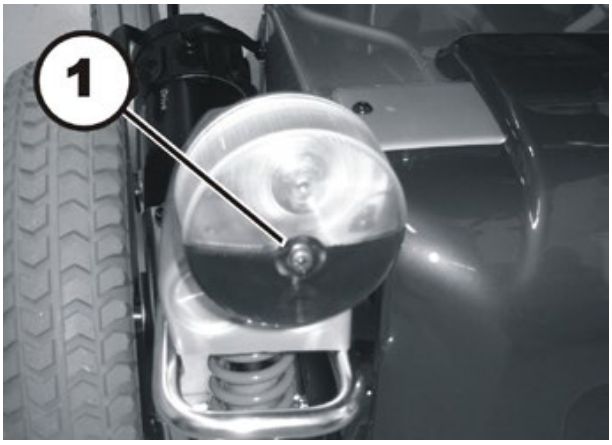
- Remove the lamp (1), as described in chapter 8.7.8.
- Loosen the Allen screw (2) using a 6 mm Allen key.
- Remove the Allen screw (2), the washer, the lamp holder (3) and the nut (4) from the seat profil.

Refitting the headlamp holder:

- Assemble all parts again in reverse order.
- Tighten the screws hand-tight.
- Check all vehicle functions.

8.7.12 Replacing the rear bulb (conventional lighting unit)

Requirements:
- Phillips screwdriver size 2



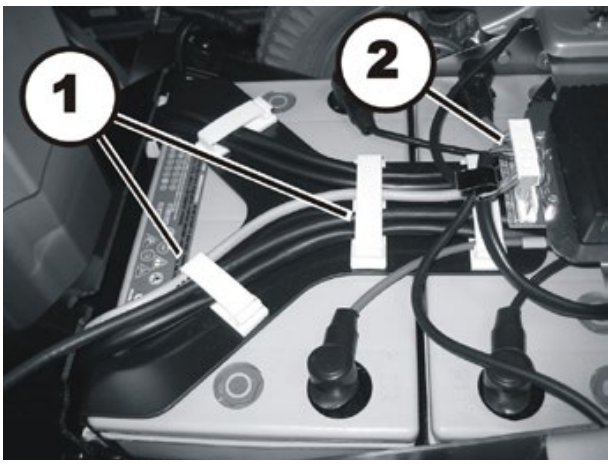
- Undo the Phillips screw in the transparent cover over the rear light/indicator combination.
- Remove the transparent plastic cover.
- Replace the defective bulb.
- Close the cover and tighten the Phillips screw finger-tight.

8.7.13 Replacing the complete rear light (conventional lighting unit)

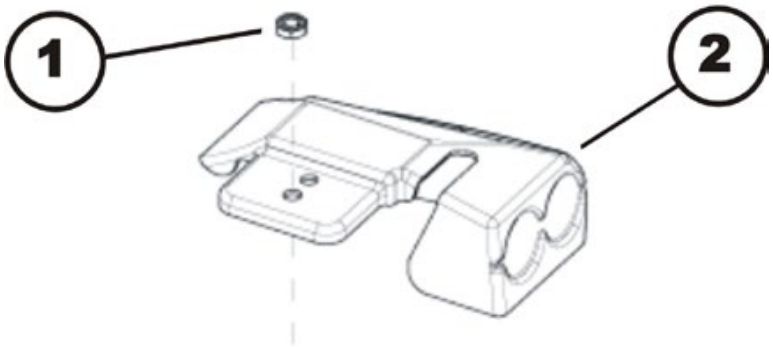
Requirements:
- 4 mm Allen key
- 8 mm socket spanner
- 13 mm socket spanner

Removing the rear light

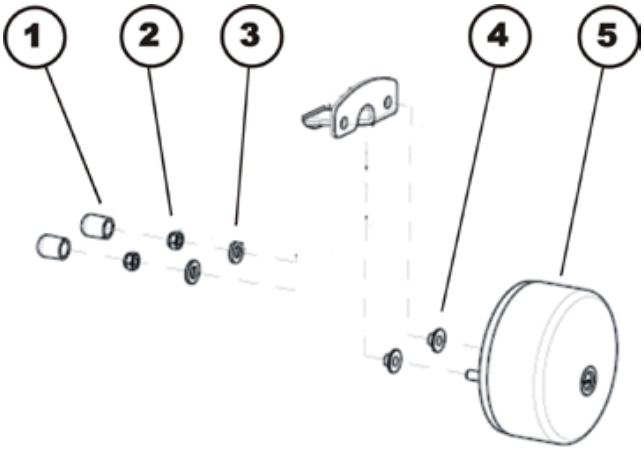
- Remove the rear and the centre cover as described in chapters 8.1.1 and 8.1.2.



- Carefully note the location of the cable and the connection locations of the various plugs. Either mark each plug and socket, or take a photograph with a digital camera.
- Loosen the cable leading to the lighting PCB from the rear light affected (2).



- Loosen the nut (1) with a 13 mm socket spanner.
- Lift the plastic casing off carefully (2).



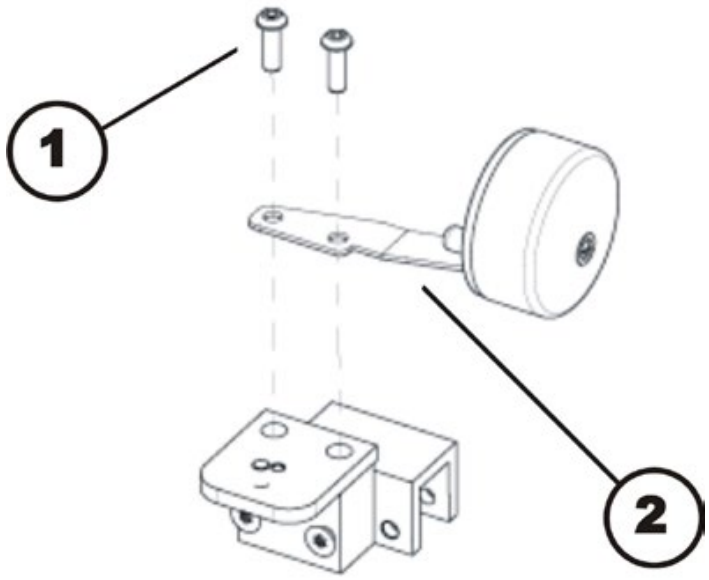
- Remove the two plastic caps (1).
- Loosen the two nuts (2) with an 8 mm socket spanner.
- Remove the nut and the washers (3).
- Pull off the rear light (5) to the rear and remove the two bushes (4).

Refitting the rear light:

- Refit the parts in reverse order.
- Now tighten all the screws finger-tight again.
- Check all vehicle functions.

8.7.14 Replacing the rear bulb holder (conventional lighting unit)

Requirements:
- Phillips screwdriver size 2
- 8 mm socket spanner
- 13 mm socket spanner



Dismantling the bulbholder:

- Remove the complete rear light as described in chapter 8.7.13.
- Undo the two Allen screws (1) with a 4 mm socket spanner and remove the screws.
- Replace the bulbholder (2).

Refitting the bulbholder:

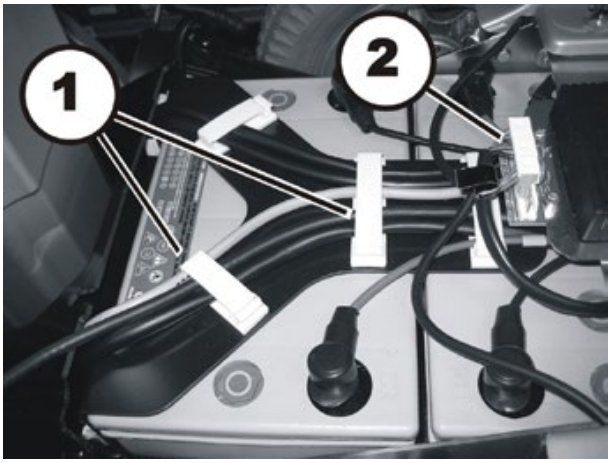
- Refit the parts in reverse order.
- Check all vehicle functions.

8.7.15 Replacing the complete rear light (LED lighting unit)

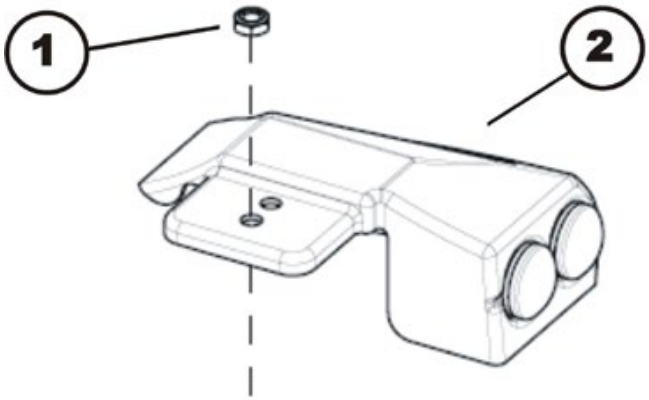
Requirements:
- 4 mm Allen key
- 13 mm socket spanner

Removing the rear light

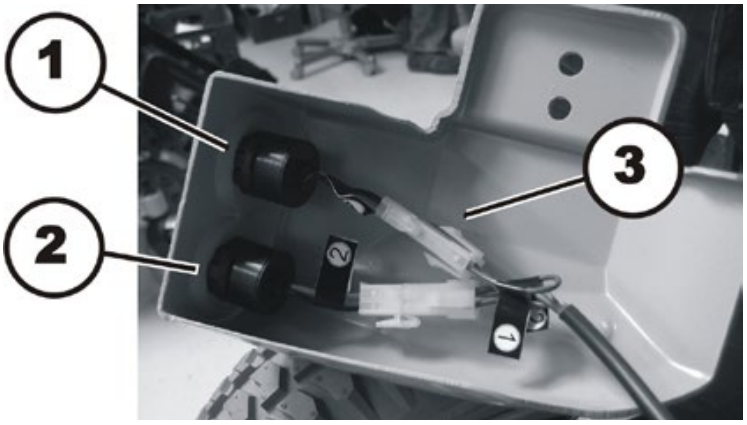
- Remove the rear and the centre cover as described in chapters 8.1.1 and 8.1.2.



- Carefully note the location of the cable and the connection locations of the various plugs. Either mark each plug and socket, or take a photograph with a digital camera.
- Loosen the cable leading to the lighting PCB from the rear light affected (2).



- Loosen the nut (1) with a 13 mm socket spanner.
- Lift off the plastic casing (2).



- Open the rear light plug (3) that is to be replaced.
- The rear lights are only clamped in the plastic casing. Replace the red rear light (1) or the indicator (2) as required. The cables are marked correspondingly.

Refitting the rear light:

- Refit all parts in reverse order.
- Now tighten all the screws finger-tight again.
- Check all vehicle functions.

8.7.16 Replacing the rear bulb holder (LED lighting unit)

Requirements:
- 4 mm Allen key
- 13 mm socket spanner

Dismantling the bulbholder:

- Remove the rear lights as described in chapter 8.7.15.
- Replacing the rear bulb holder (LED lighting unit).

Refitting the bulbholder:

- Refit all parts in reverse order.
- Check all vehicle functions.

8.8 Front wheel forks

8.8.1 Replacing the wheel fork

WARNING: Danger of crushing!

The mobility device is very heavy. Injury hazard to hands and feet!

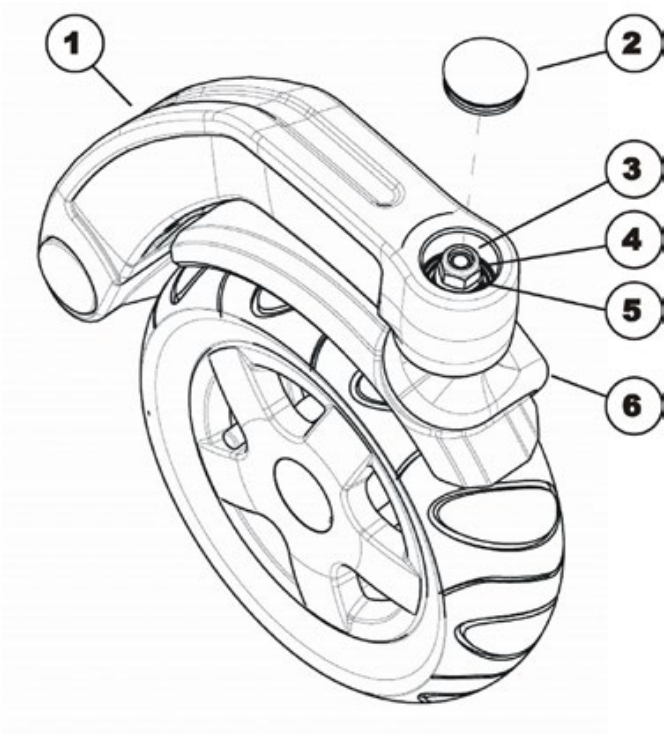
- *Use proper lifting techniques.*

Injury hazard caused by uncontrolled movement of the mobility device!

- *Switch the power supply off (ON/OFF key).*
- *Engage the drive.*
- *Before raising the vehicle, secure the wheels by blocking them with wedges.*

Requirements:

- 19 mm socket spanner
- blade screwdriver
- long wooden blocks, min. 14 x 14 x 30 cm



Dismantling the wheel fork:

- Jack up the mobility aid using several wooden blocks. Use proper lifting techniques.
- Use a screwdriver to remove the plastic cap (2).
- Loosen and remove the nut (3) with a 19 mm socket spanner.
- Pull the wheel fork (6) from the front wheel carrier (1) in a downward direction. In doing so, please pay attention to the washers (4), spacers (5) and separable ball bearings (not to be seen in the illustration).

Refitting the wheel fork:

- Refit the parts in reverse order.
- When fitting the ball bearings please ensure that the wide inner ring faces outward in each case.
- Adjust the wheel fork as described in chapter 8.8.2.
- To conclude, check all the mobility aid functions.

8.8.2 Adjusting the wheel fork

WARNING: Danger of crushing!

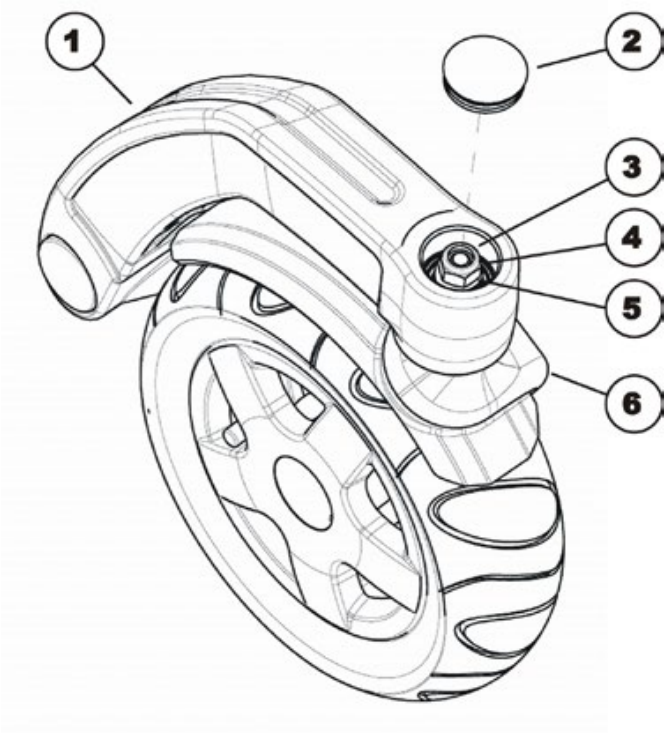
The mobility device is very heavy. Injury hazard to hands and feet!

· *Use proper lifting techniques.*

Requirements:

· 19 mm socket spanner

· blade screwdriver



· If necessary remove the cover cap (2).

· Tilt the mobility aid to the rear. Use proper lifting techniques.

· Rotate the wheel forks (5) upwards.

· Let go of the wheel forks so that they can swing downwards again.

· Adjust the nut (3) with a 19mm socket spanner so that the wheel forks are not too loose but can still rotate freely.
The wheel forks should oscillate to the opposite side a maximum of once and then come to rest facing downwards.

· Place the mobility aid on all four wheels again.

· Test the mobility aid's manoeuvrability.

· Repeat the adjustment steps if necessary until the castors are correctly adjusted.

· Refit the cap (2).

8.8.3 Changing a front wheel

WARNING: Danger of crushing!

The mobility device is very heavy. Injury hazard to hands and feet!

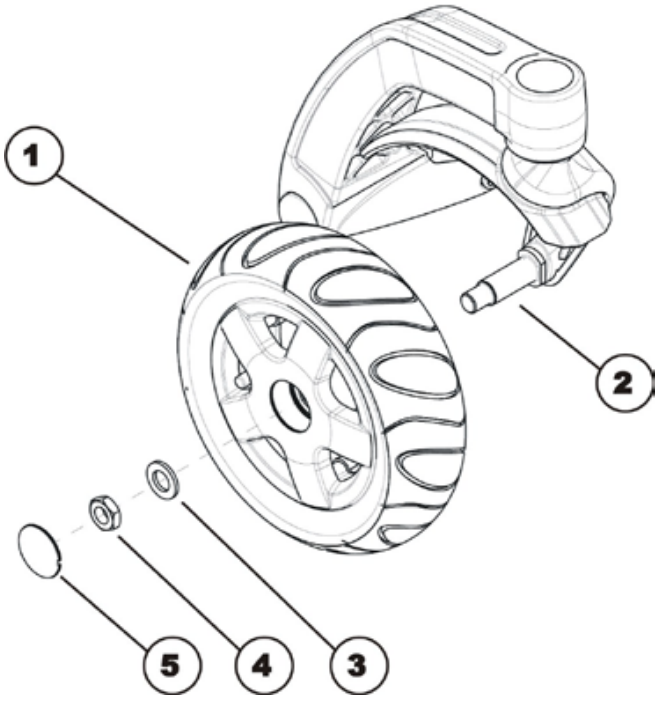
- *Use proper lifting techniques.*

Injury hazard caused by uncontrolled movement of the mobility device!

- *Switch the power supply off (ON/OFF key).*
- *Engage the drive.*
- *Before raising the vehicle, secure the wheels by blocking them with wedges.*

Requirements:

- 24 mm socket spanner
- 24 mm spanner
- blade screwdriver
- long wooden blocks, min. 14 x 14 x 30 cm
- Medium-strength thread-locking fluid, e.g. Loctite 243
- Hot air gun



Removing the wheel:

- Jack up the mobility aid using several wooden blocks. Use proper lifting techniques.
- Use a Phillips screwdriver to remove the plastic cap (5).
- Heat the nut (4) using a hot air gun to soften the thread locking adhesive.
  Alternatively, you can also counter the axle (2) using a 24 mm wrench.
- Loosen and remove the nut with a 24 mm socket spanner.

- Remove the washer (3).
- Take the wheel (1) off the axle (2).

Refitting the wheel:

- Refit the parts in reverse order.
- Pay attention to the correct direction of rotation when re-installing the wheels.
- Install the nut (4) with medium strength thread locking adhesive.

8.9 Replacing the front wheel carrier

8.9.1 Replacing the front wheel carrier (only Standard Storm4)

WARNING: Danger of crushing!

The mobility device is very heavy. Injury hazard to hands and feet!

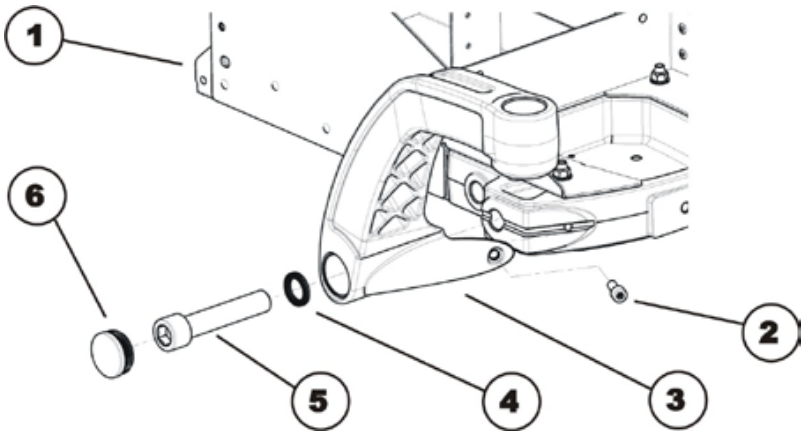
- *Use proper lifting techniques.*

Injury hazard caused by uncontrolled movement of the mobility device!

- *Switch the power supply off (ON/OFF key).*
- *Engage the drive.*
- *Before raising the vehicle, secure the wheels by blocking them with wedges.*

Requirements:

- 5 mm Allen key
- 17 mm Allen key
- blade screwdriver
- 25 Nm torque wrench
- 200 Nm torque wrench
- long wooden blocks, min. 14 x 14 x 30 cm



Dismantling the front wheel carrier:

- Jack up the mobility aid using several wooden blocks. Use proper lifting techniques.
- Use a screwdriver to remove the plastic cap (6).
- Loosen and remove the Allen screw (2) with a 5 mm Allen key.
- Loosen and remove the Allen screw (5) with a 17 mm Allen key.
- Remove the two Nord-Lock lock washers (4).
- Remove and replace the front wheel carrier (3).

Refitting the front wheel carrier:

- Refit the parts in reverse order.
- Use Loctite locking varnish to secure the Allen screw (2).
- Tighten the Allen screw (2) to 25 Nm.
- Tighten the Allen screw (5) to 200 -180 Nm.
- To conclude, check all the mobility aid functions.

8.9.2 Replacing the front wheel carrier (only Storm⁴ X-plore)

WARNING: Danger of crushing!
The mobility device is very heavy. Injury hazard to hands and feet!

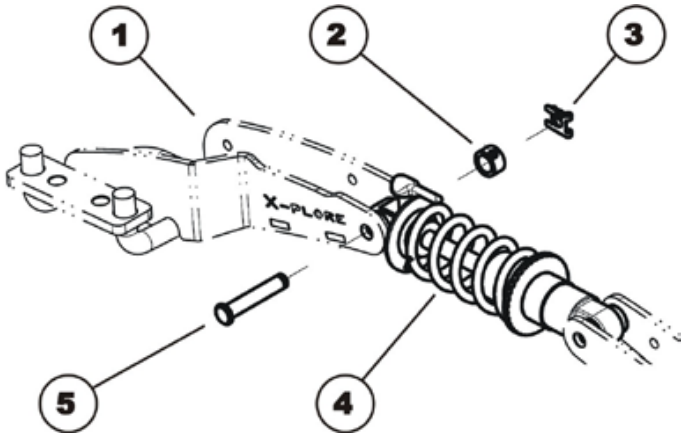
- *Use proper lifting techniques.*

Injury hazard caused by uncontrolled movement of the mobility device!

- *Switch the power supply off (ON/OFF key).*
- *Engage the drive.*
- *Before raising the vehicle, secure the wheels by blocking them with wedges.*

Requirements:

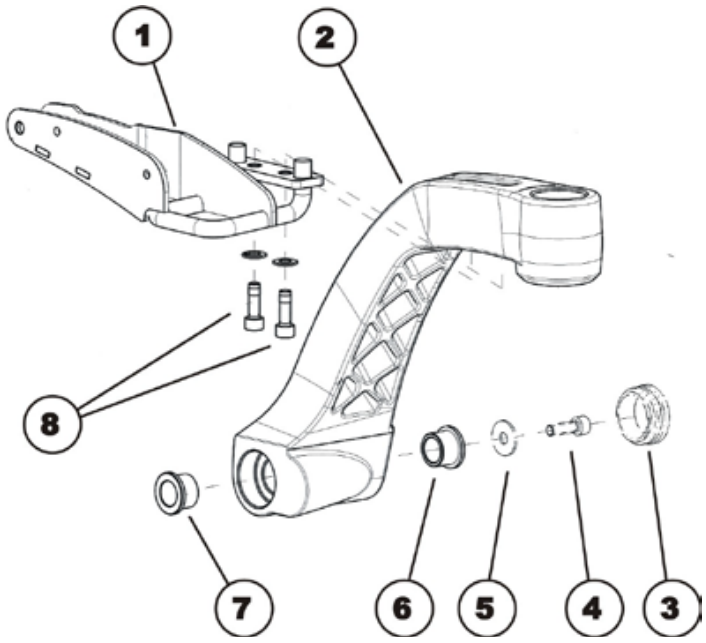
- 4 mm Allen key
- 5 mm Allen key
- 6 mm Allen key
- 17 mm Allen key
- blade screwdriver
- 25 Nm torque wrench
- 200 Nm torque wrench
- long wooden blocks, min. 14 x 14 x 30 cm



Dismantling the front wheel carrier:

- Jack up the mobility aid using several wooden blocks. Use proper lifting techniques.
- Remove the securing clip (3).
- Remove the spacer (2).

· Carefully remove the bolts (5) which connect the shock absorber (4) to the swing arm (1).



· Undo and remove the two Allen screws (8) with a 6 mm Allen key. Take care with the washers while doing so.

· Use a screwdriver to remove the plastic cap (3).

· Remove the swing arm (1).

· Undo and remove the Allen screw (4) with a 5 mm Allen key.

· Remove the washer (5).

· Remove the sliding bearing (6).

· Remove the front wheel cradle (2) and replace it. When doing so, take care with the sliding bearing (7).

Fitting the front wheel cradle:

· Replace the parts in the reverse order.

8.10 Drive wheels

8.10.1 Replacing the drive wheel

WARNING: Danger of crushing!

The mobility device is very heavy. Injury hazard to hands and feet!

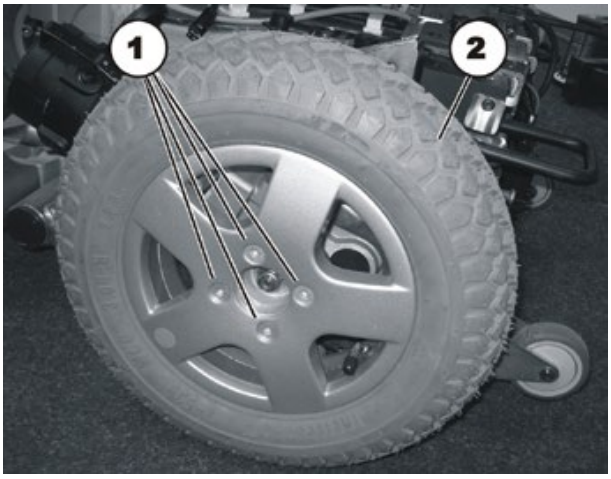
- *Use proper lifting techniques.*

Injury hazard caused by uncontrolled movement of the mobility device!

- *Switch the power supply off (ON/OFF key).*
- *Engage the drive.*
- *Before raising the vehicle, secure the wheels by blocking them with wedges.*

Note
In most cases the drive wheel is fixed to the wheel hub by means of five Allen screws. Only Trelleborg tyres are fixed by means of four Allen screws.

Requirements:
- 6 mm Allen key
- Long wooden blocks, min. 14 x 14 x 30 cm



Removing the drive wheel:

- Lift the wheelchair on one side and place a 14 cm high wooden block underneath it so that the drive wheel is off the ground and can rotate freely. Use proper lifting techniques.
- Loosen the four or five 6 mm Allen screws (1).
- Take the wheel (2) off the wheel hub.

Refitting the drive wheel:

NOTE
Please ensure that the wheel is re-fitted on the same side and in the same running direction as removed.

- Refit the wheel in reverse order.

8.10.2 Replacing a tyre or inner tube

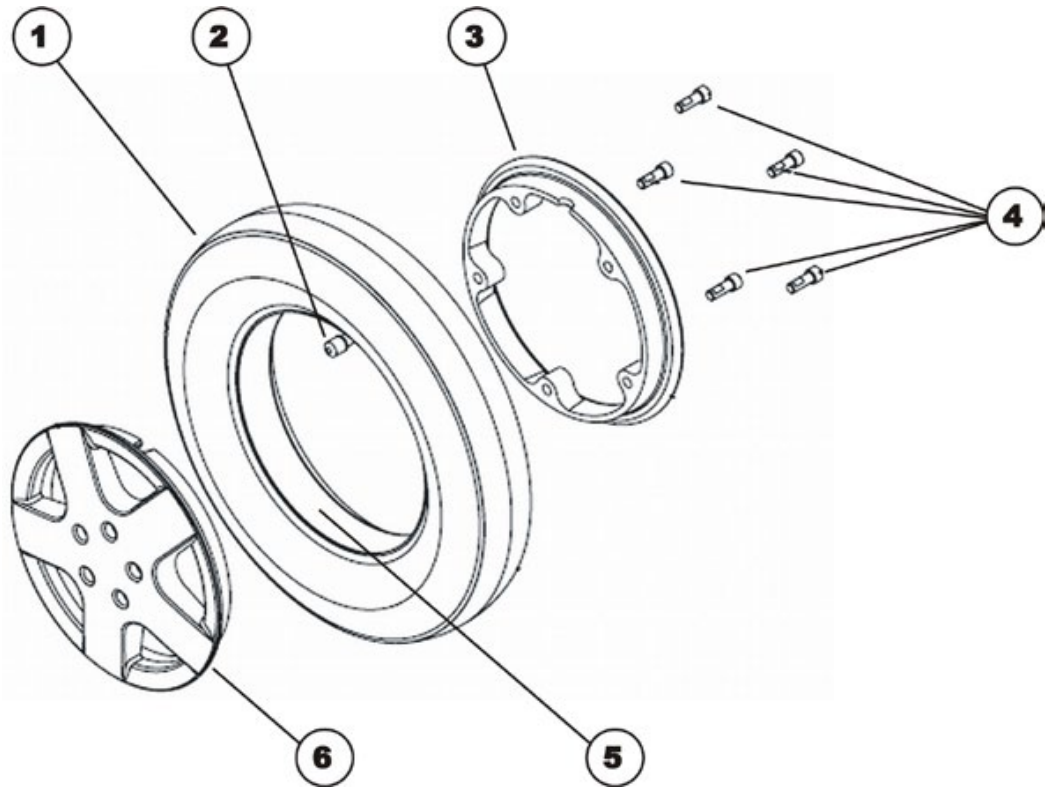
Note
There are three different types of tyres or inner tubes, and specific points must be observed for the replacement of each type.
It is easy to tell the difference between the tyre or inner tube types:
- Pneumatic tyres have black valve caps.
- Puncture-protected tyres have red valve caps.
- Puncture-proof tyres have no valves.

Please proceed in accordance with the appropriate chapter:
- Replacing pneumatic tyres – see chapter 8.10.2.1
- Replacing puncture-protected tyres – see chapter 8.10.2.2
- Replacing puncture-proof tyres – see chapter 8.10.2.3

8.10.2.1 Replacing pneumatic tyres

Note
Pneumatic tyres have black valve caps. Puncture-protected tyres have red valve caps

Requirements:
- 6 mm Allen key
- Two long wooden blocks, min. 14 x 14 x 30 cm
- Repair kit for inner tube tyres **or** a new inner tube.
- Tyre pump or compressor
- Talcum powder



Removing the tyres:

- Remove the wheel as described in chapter 8.10.1.
- Unscrew the valve cap (2).

ATTENTION: Explosion hazard!

If the wheelchair is fitted with pneumatic tyres, the wheel can explode if the air is not released from the tyre before removing the wheel!

- *Always release the air from the wheel before you remove it. Depress the small tappet in the centre of the valve!*

- Press the spring pin on the valve and remove the air completely from the tyre.
- Undo the five 6 mm Allen screws (4) on the inside of the wheel.
- Release the inner (3) and outer rim ring (6) from the tyre (1).
- Remove the inner tube (5) from the tyre.
- Replace defective or worn parts or repair the parts.

Refitting the tyres:

- Refit the inner tube in the tyre.

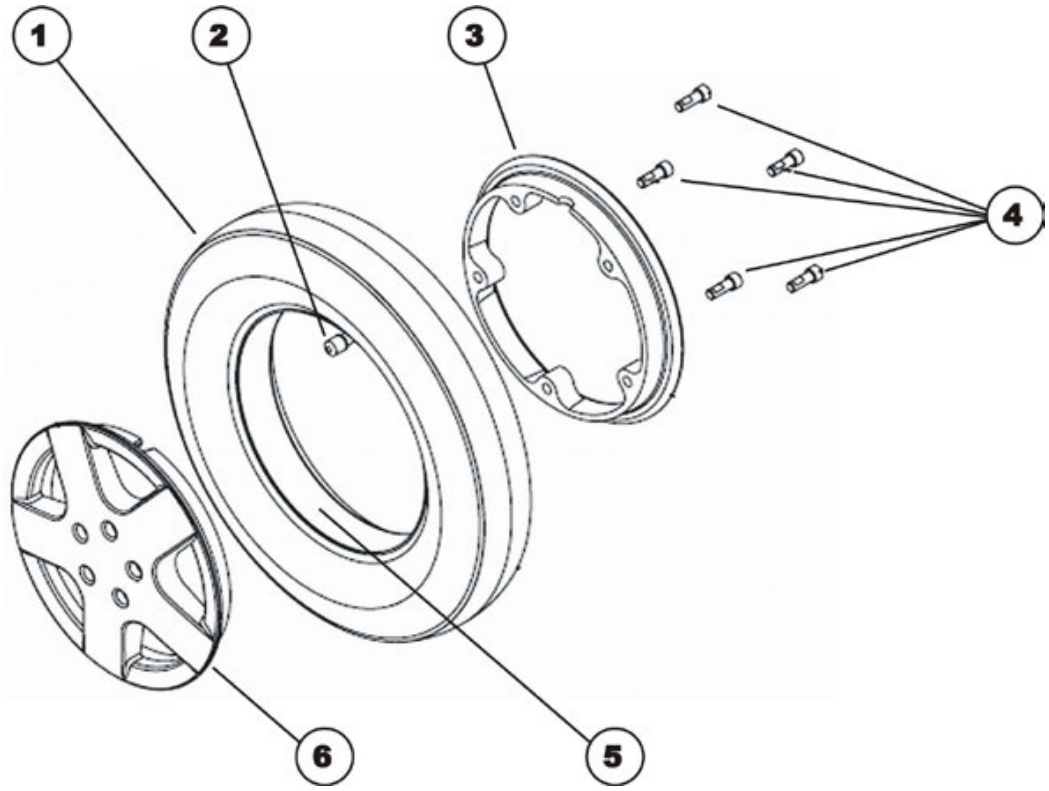
NOTE
If the old inner tube is to be repaired and used again and has become wet during repair, installation can be facilitated by applying some talcum powder to the inner tube.

- Refit rim rings (3) and (6) to the tyre. Please ensure that the boreholes and thread for the screws are exactly above each other.
- Fill some air into the inner tube.
- Refit the five Allen screws on the inner side of the wheel and tighten them.
- Check the exact fit of the tyre on the rim.
- Inflate the tyre to the prescribed air pressure.
- Re-check the exact fit of the tyre on the rim.
- Screw the valve cap back on.
- Refit the wheel.

8.10.2.2 Replacing puncture-protected tyres

Note
Pneumatic tyres have black valve caps. Puncture-protected tyres have red valve caps

Requirements:
- 6 mm Allen key
- Two long wooden blocks, min. 14 x 14 x 30 cm
- Tyre pump or compressor
- Talcum powder



Removing the tyres:

- Remove the wheel as described in chapter 8.10.1.

ATTENTION: Explosion hazard!

If the wheelchair is fitted with pneumatic tyres, the wheel can explode if the air is not released from the tyre before removing the wheel!

- *Always release the air from the wheel before you remove it. Depress the small tappet in the centre of the valve!*

CAUTION!

Material damage hazard. The valve can become blocked by the puncture protection gel and be unusable!

- *During the following work you should always hold the valve up so that the puncture protection gel cannot enter the valve.*

- Remove the valve cover (2).
- Press the release pin in the valve inwards and evacuate all the air from the tyre.
- Undo the five 6 mm Allen screws (4) on the inside of the wheel.
- Remove the inner (3) and outer (6) ring of the rim from the tyre (1).
- Replace any defective or worn parts.

Refitting the tyres:

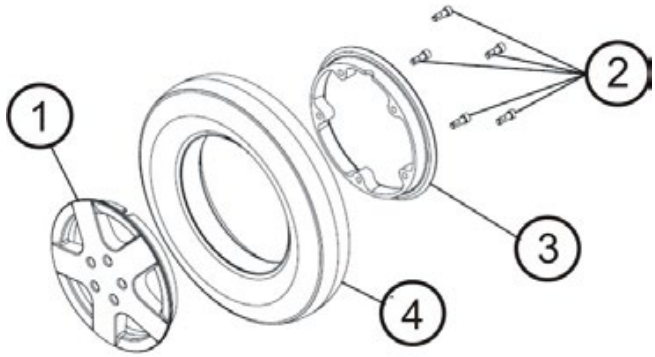
- Refit the inner tube in the tyre.

Note
If the old inner tube is to be repaired and re-used, and has become wet during repair, you can make replacement easier by sprinkling the inner tube with a little talcum powder.

- Refit rim rings (3) and (6) to the tyre. Please ensure that the boreholes and thread for the screws are exactly above each other.
- Fill some air into the inner tube.
- Refit the five Allen screws on the inner side of the wheel and tighten them.
- Check the exact fit of the tyre on the rim.
- Inflate the tyre to the prescribed air pressure.
- Re-check the exact fit of the tyre on the rim.
- Screw the valve cap back on.
- Refit the wheel.

8.10.2.3 Replacing puncture-proof tyres

Requirements:
- 6 mm Allen key
- Two long wooden blocks, min. 14 x 14 x 30 cm
- Three joiner's clamps with plastic caps
- Torque spanner 5 - 25 Nm (or similar)
- Talcum powder



Removing the tyres:

- Remove the wheel as described in chapter 8.10.1.

ATTENTION: Explosion hazard!

There is considerable pressure in the tyre. Danger of injury! Parts can be thrown out and injure you if you do not secure the rim rings.

- *Secure the rim rings with joiner's clamps.*

- Secure the rim rings against unexpected discharge with three joiner's clamps. When doing so, ensure that you do not scratch the rims.
- Undo the five 6 mm Allen screws (2) on the inside of the wheel.
- Now loosen the joiner's clamps carefully and alternately until you can remove the rim rings without danger.
- Remove the inner (3) and outer (1) ring of the rim from the tyre (4).
- Replace any defective or worn parts.

Refitting the tyres:

- Refit the tyres to the rim in the reverse sequence.
- When fitting the rim rings together, ensure that the drillholes and threads for the bolts are placed exactly above each other.
- Place the joiner's clamps in position.
- Tighten the joiner's clamps alternately in small stages until the rim rings are precisely aligned.
- Tighten the Allen screws (2) to 18 Nm.

8.10.3 Replacing the drive wheel hub

CAUTION!

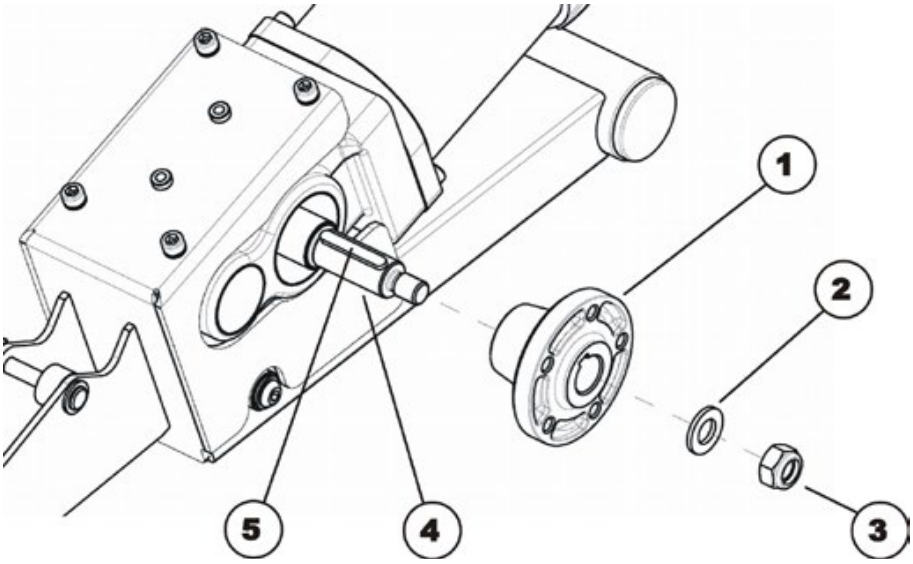
Possible material damage to mobility device! Collisions can be caused if the adjusting washers are removed during fitting work to the drive wheels!

Adjusting washers are often fitted between the drive shaft and the wheel hub to even out tolerances. If these adjusting washers are removed and not replaced again, collisions can be caused.

- *Always replace the adjusting washers exactly as they were before you started dismantling.*

Requirements:

- 19 mm socket spanner



Removing the drive wheel hub:

- Loosen and remove the nut (3) with a 19 mm socket spanner.
- Remove the washer (2).
- Take the wheel hub (1) off the axle (4).
- Take the feather key (5) off the axle.

Refitting the drive wheel hub:

- Refit the drive wheel hub parts in reverse order.
- Use a thin film of lubricant to make pushing the wheel hub onto the axle easier.

8.11 Drive unit

8.11.1 Replacing the motor/transmission unit (Standard Storm4)

WARNING: Danger of crushing!

The mobility device is very heavy. Injury hazard to hands and feet!

- *Use proper lifting techniques.*

Injury hazard caused by uncontrolled movement of the mobility device!

- *Switch the power supply off (ON/OFF key).*
- *Engage the drive.*
- *Before raising the vehicle, secure the wheels by blocking them with wedges.*

ATTENTION: Danger of crushing!

The motor gearbox unit is extremely heavy. Injury hazards to hands!

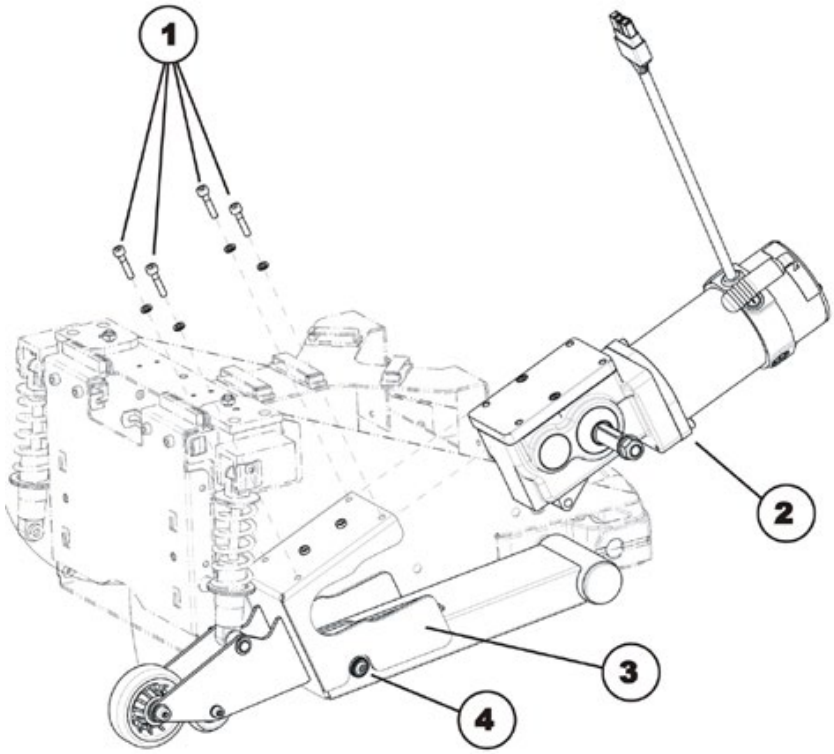
- *Please note the high weight*

Requirements:

- 5 mm Allen key
- 6 mm Allen key
- 19 mm socket spanner
- long wooden blocks, min. 14 x 14 x 30 cm

Removing the motor/transmission unit:

- Remove the rear and the centre battery compartment cover as described in chapters 8.1.1 und 8.1.2.
- Pull the motor plug out of the power module.
- Open the cable clamps and expose the motor cable.
- Remove the drive wheel as described in chapter 8.10.1.
- Remove the wheel hub as described in chapter 8.10.3.
- Remove the splash guard as described in chapter 8.1.6.



- Undo the four Allen screws (1) with a 5 mm Allen key.
- Remove the screws together with the Nord-Lock lock washers.
- Undo the Allen screw (4) with a 5 mm Allen key.
- Remove the screws together with the washers.
- Pull the motor/transmission unit (2) out of the mounting (3) in a forward direction. In doing so, please observe the high weight of the unit.

Refitting the motor/transmission unit:

- Replace the defective parts.
- Refit the motor/transmission unit in reverse order.
- To conclude, check all the mobility aid functions.

8.11.2 Replacing the motor/transmission unit (SSD motor)

WARNING: Danger of crushing!

The mobility device is very heavy. Injury hazard to hands and feet!

- *Use proper lifting techniques.*

Injury hazard caused by uncontrolled movement of the mobility device!

- *Switch the power supply off (ON/OFF key).*
- *Engage the drive.*
- *Before raising the vehicle, secure the wheels by blocking them with wedges.*

ATTENTION: Danger of crushing!

The motor gearbox unit is extremely heavy. Injury hazards to hands!

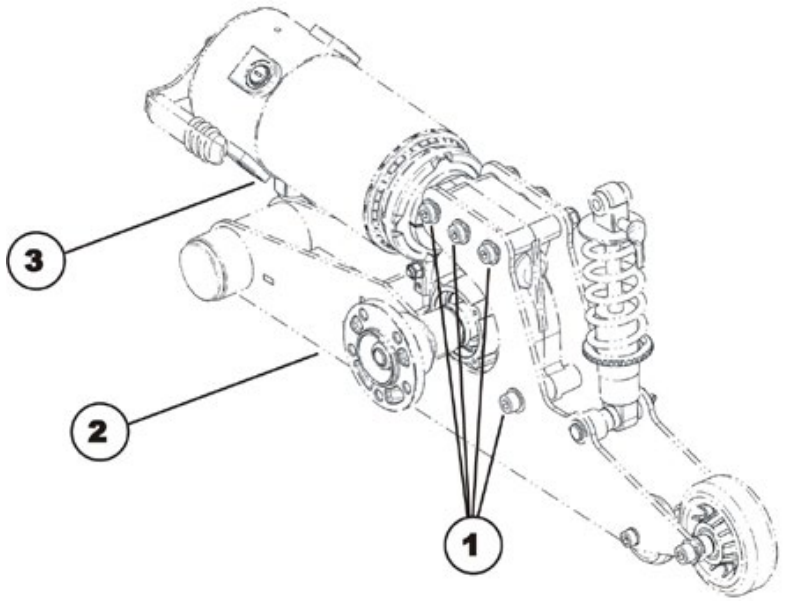
- *Please note the high weight*

Requirements:

- 6 mm Allen key
- 13 mm socket spanner
- long wooden blocks, min. 14 x 14 x 30 cm

Removing the motor/transmission unit:

- Remove the rear and the centre battery compartment cover as described in chapters 8.1.1 und 8.1.2.
- Pull the motor plug out of the power module.
- Open the cable clamps and expose the motor cable.
- Remove the drive wheel as described in chapter 8.10.1.
- Remove the wheel hub as described in chapter 8.10.3.
- Remove the splash guard as described in chapter 8.1.6.



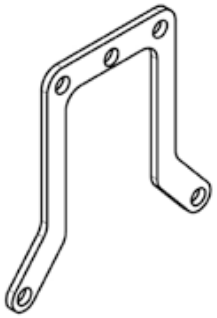
- Loosen the four Allen screws (1) with a 6 mm Allen key and a 13 mm socket spanner..
- Remove the screws together with the washers.
- Pull the motor/transmission unit (3) out of the mounting (2) in a forward direction. In doing so, please observe the high weight of the unit.

Refitting the motor/transmission unit:

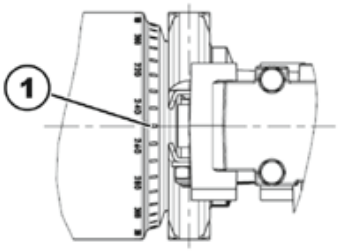
- Replace the defective parts.
- Check the serial number of the gearbox housing.

  Up to the serial number 20110400xx, the gearbox housing is 44.5 mm wide: '
  The compensation sheet (see right) must be installed.

  Up to the serial number 20110400xx, the gearbox housing is 49.5 mm wide:
  The compensation sheet is not necessary.



- Refit the motor/transmission unit in reverse order.
- Use the scale to align the motor to the centre axis (1).
  - Left motor: 185°
  - Right motor: 5°.



- Make sure that the motor cable cannot be pinched or bent, and that it is not exposed to chafing in any place.
- To conclude, you should always carry out a trial run to test the vehicle functions

8.11.3 Replacing the motor/transmission unit (Storm4 X-plore)

WARNING: Danger of crushing!

The mobility device is very heavy. Injury hazard to hands and feet!

- *Use proper lifting techniques.*

Injury hazard caused by uncontrolled movement of the mobility device!

- *Switch the power supply off (ON/OFF key).*
- *Engage the drive.*
- *Before raising the vehicle, secure the wheels by blocking them with wedges.*

ATTENTION: Danger of crushing!

The motor gearbox unit is extremely heavy. Injury hazards to hands!

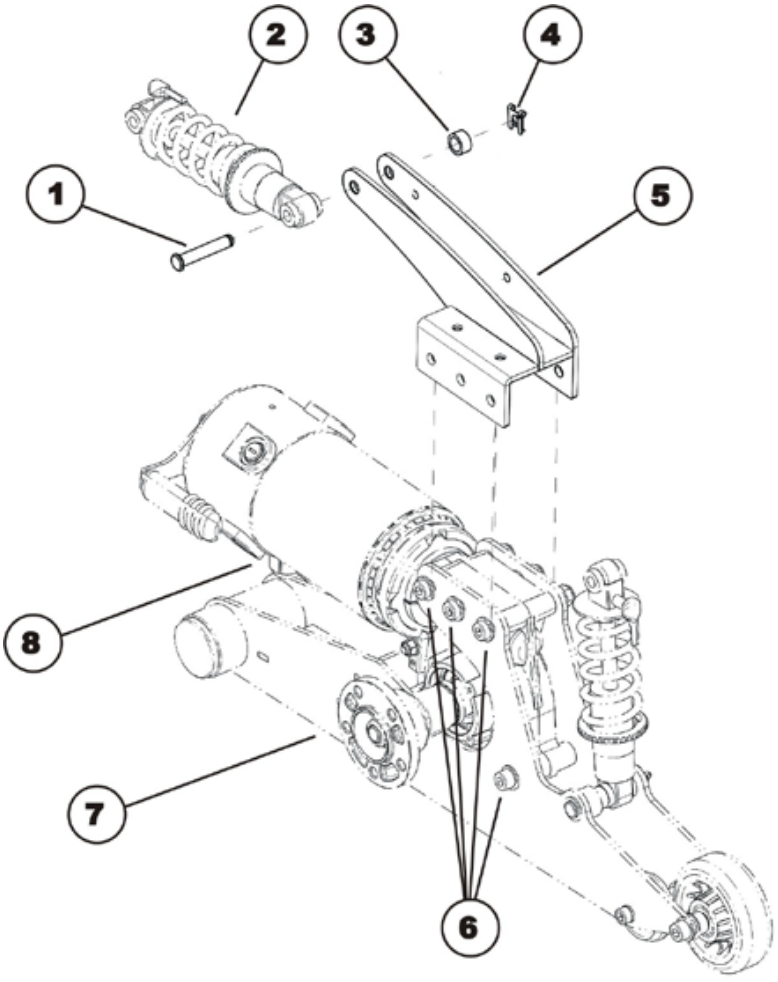
- *Please note the high weight*

Requirements:

- 5 mm Allen key
- 6 mm Allen key
- 13 mm socket spanner
- 19 mm socket spanner
- long wooden blocks, min. 14 x 14 x 30 cm

Removing the motor/transmission unit:

- Remove the rear and the centre battery compartment cover as described in chapters 8.1.1 und 8.1.2.
- Pull the motor plug out of the power module.
- Open the cable clamps and expose the motor cable.
- Remove the drive wheel as described in chapter 8.10.1.
- Remove the wheel hub as described in chapter 8.10.3.
- Remove the splash guard as described in chapter 8.1.6.



- Remove the securing clip (4).
- Remove the spacer (3).
- Carefully remove the bolts (1) which connect the shock absorber (2) to the swing arm (5).
- Loosen the four Allen screws (6) with a 6 mm Allen key and a 13 socket spanner.
- Remove the screws together with the washers.
- Pull the motor/transmission unit (8) out of the mounting (7) in a forward direction. In doing so, please observe the high weight of the unit.

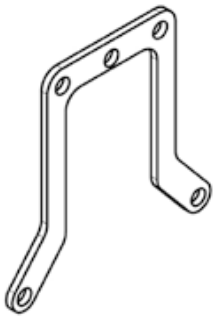
Refitting the motor/transmission unit:

- Replace the defective parts.

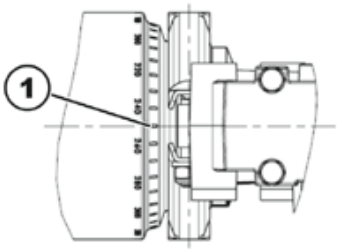
- Check the serial number of the gearbox housing.

  Up to the serial number 20110400xx, the gearbox housing is 44.5 mm wide: '
  The compensation sheet (see right) must be installed.

  Up to the serial number 20110400xx, the gearbox housing is 49.5 mm wide:
  The compensation sheet is not necessary.



- Refit the motor/transmission unit in reverse order.
- Use the scale to align the motor to the centre axis (1).
  - Left motor: 185°
  - Right motor: 5°.



- Make sure that the motor cable cannot be pinched or bent, and that it is not exposed to chafing in any place.

- To conclude, you should always carry out a trial run to test the vehicle functions

8.11.4 Replacing or rotating the motor / gearbox unit sealing ring (SSD motor)

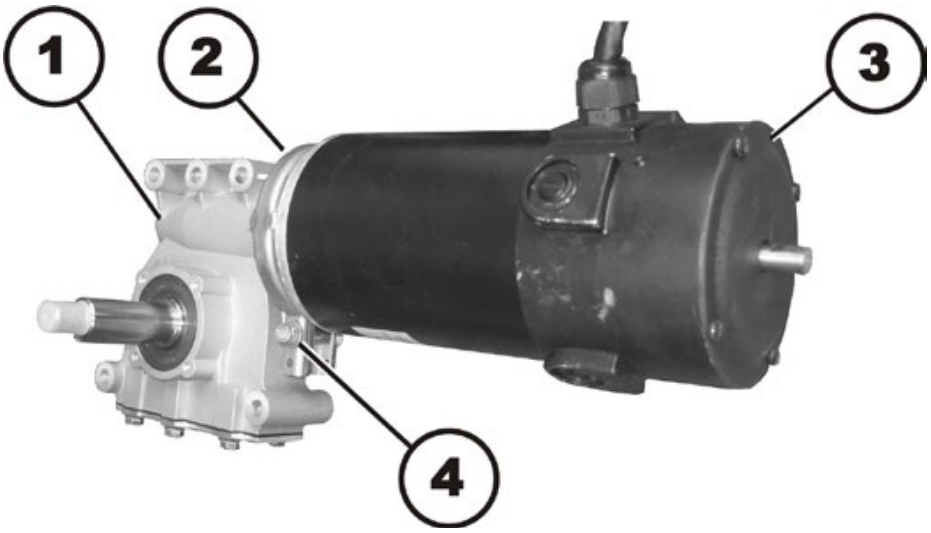
CAUTION: Danger of crushing!

The motor / gearbox unit is very heavy. Danger of injury to the hands!

· *Pay attention to the heavy weight.*

Requirements:

· 10 mm socket wrench



Uninstalling the sealing ring:

· Uninstall the motor / gearbox unit, as described in chapter 8.11.2/8.11.3.

· Use the 10 mm socket wrench to loosen and remove the self-securing nuts (4) including the washers.

· Remove the carriage bolt, which secures the sealing ring (2).

· Carefully bend the sealing ring apart and remove it.

Installing the sealing ring:

· Install the sealing ring so that the square hole for the carriage bolt is on the inside of the wheelchair.

· Insert the carriage bolt through the sealing ring.

· Install the washer and the self-locking nut.

· Do not tighten the self-locking nut completely, as the motor orientation must be adjusted during installation.

8.11.5 Replacing the motor / gearbox coupling (SSD motor)

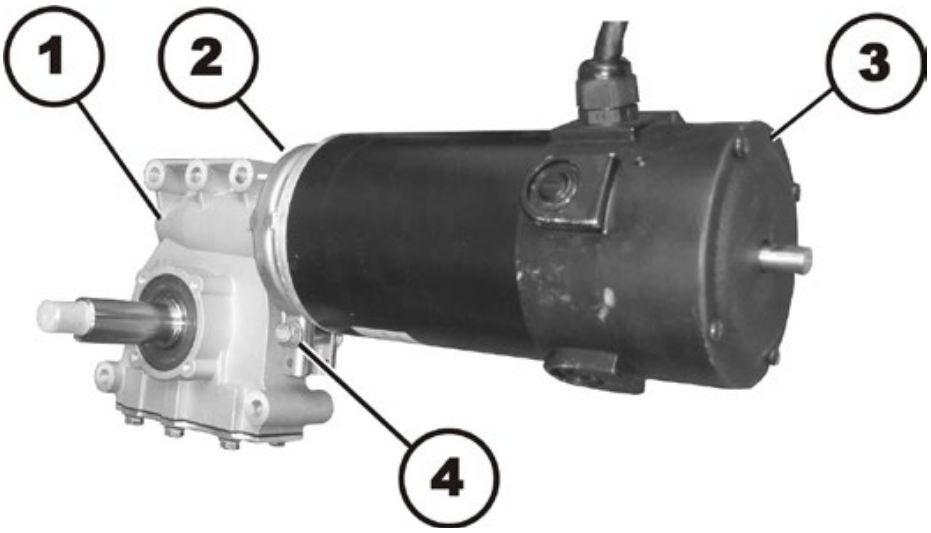
CAUTION: Danger of crushing!

The motor / gearbox unit is very heavy. Danger of injury to the hands!

· *Pay attention to the heavy weight.*

Requirements:

· 10 mm socket wrench



Uninstalling the motor / gearbox coupling:

· Uninstall the motor / gearbox unit, as described in chapter 8.11.2/8.11.3.

· Use the 10 mm socket wrench to loosen and remove the self-securing nut (4).

· Remove the carriage bolt, which secures the sealing ring (2).

· Carefully bend the sealing ring apart and remove it.

WARNING!

Danger of damage to the wheelchair if the coupling is not serviced correctly.

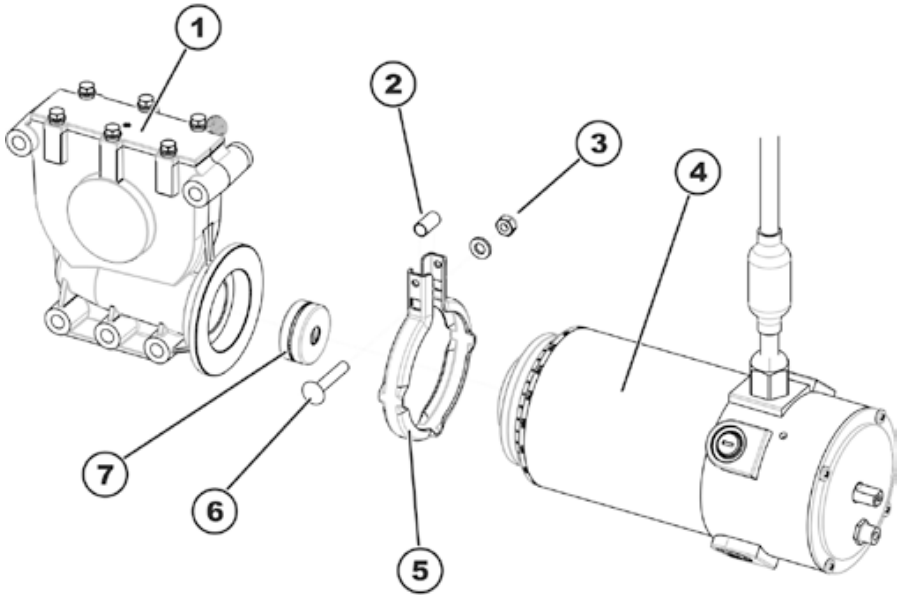
· *Be careful not to damage the coupling mechanism during maintenance work.*

· Carefully pull the motor (3) and the gearbox (1) apart.

· Remove the component parts of the coupling.

· If necessary replace the coupling.

Installing the motor / gearbox coupling:



- Place the new clutch (7) on the motor axle. Pay attention to the position of the groove.
- Position the locking ring (5) on the motor (4) or the gearbox (1).
- Carefully insert the motor into the gearbox. Pay attention to the position of the groove in the axle of the gearbox. If necessary, rotate the motor and gearbox to the correct position.
- Insert the carriage bolt through the locking ring. Do not forget the spacer sleeve (2)!
- Install the washer and the self-locking nut.
- Do not tighten the self-locking nut completely, as the motor orientation must be adjusted during installation.
- Install the motor / gearbox unit, as described in chapter 8.11.2/8.11.3.

8.11.6 Replacing the carbon brushes (Standard motor)

Note
Always replace all the carbon brushes on both motors.

WARNING: Danger of crushing!

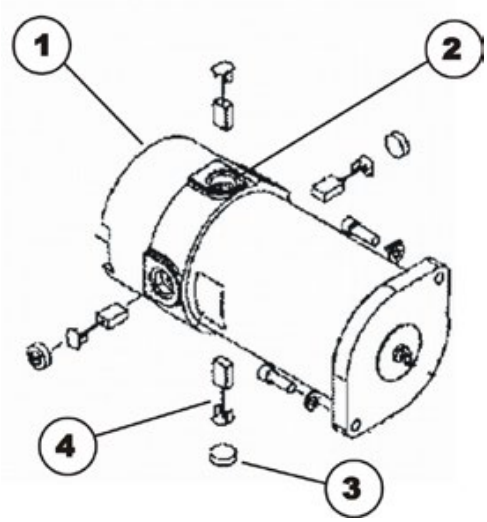
The mobility device is very heavy. Injury hazard to hands and feet!

- *Use proper lifting techniques:*

Requirements:
- 5 mm Allen key
- 6 mm Allen key
- 19 mm socket spanner
- blade screwdriver
- long wooden blocks, min. 14 x 14 x 30 cm

Removing the carbon brushes:

- Switch off the mobility aid.
- Remove the drive wheels as described in chapter 8.10.1.



- Disengage the motor (1) by setting the engaging lever to “Push“.
- Loosen and remove all four plastic caps (3) using a blade screwdriver.
- Note the fixing position and location of the carbon brushes.

Note
Used carbon brushes need to the refitted exactly in the same position from which they were taken in order to guarantee optimum contact to the collector.

- Make a marking on the motor and the carbon brushes in order to guarantee correct refitting.
- Remove the carbon brushes completely from the mounting (2).
- Check the carbon brush and spring for the level of wear, broken components or discolouration.

Refitting the carbon brushes:

- Depending on the condition of the brush and the spring:
  - either replace the brushes in exactly the same position from which they were taken or
  - fit new brushes.
- Refit the plastic caps and tighten them firmly.
- Refit the drive wheels as described in chapter 8.10.1.

Note
The following procedure is necessary to run the carbon brushes in after replacement and thus guarantee maximum performance.

WARNING: Risk of accidents!

Hazards to workers, surroundings and mobility device!

- *Do not leave the mobility device unattended during the following procedure!*
- *Secure the area.*

- Lift the wheelchair on one side and place a 14 cm high wooden block underneath it so that the drive wheel is off the ground and can rotate freely. Use proper lifting techniques.
- Also repeat this on the other side of the mobility aid.
- Allow the motors to run for an hour in forward direction.
- Allow the motors to cool down for 30 minutes.
- Allow the motors to run for an hour in reverse direction.
- Lift the mobility aid off the wooden blocks.

8.11.7 Replacing the carbon brushes (SSD motor)

Note
Always replace all the carbon brushes on both motors.

CAUTION: Danger of crushing!
· *The mobility aid is very heavy. Use proper lifting techniques!*

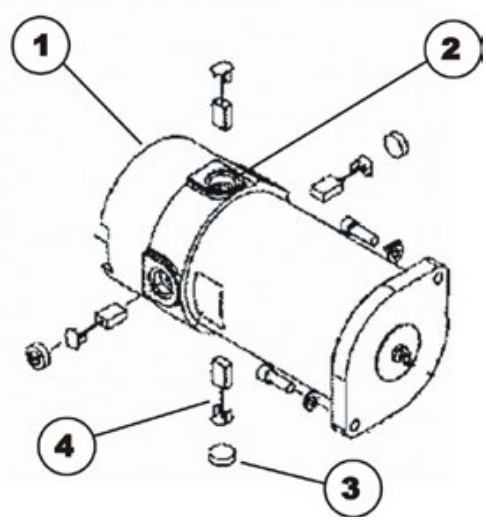
WARNING: Danger of crushing!
The mobility device is very heavy. Injury hazard to hands and feet!
· *Use proper lifting techniques:*

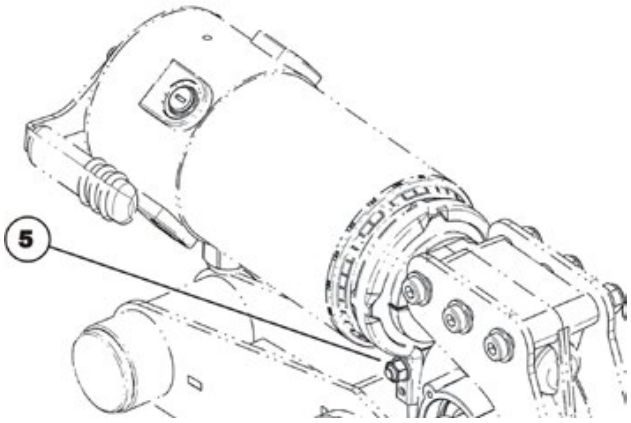
Requirements:
· 5 mm Allen key
· 6 mm Allen key
· 10 mm socket spanner
· 19 mm socket spanner
· blade screwdriver
· long wooden blocks, min. 14 x 14 x 30 cm

Removing the carbon brushes:

· Switch off the mobility aid.

· Remove the drive wheels as described in chapter 8.10.1.





· Disengage the motor (1) by setting the engaging lever to “Push“.

Note
In the case of the SSD motor, you can unto the bolt (5) with a 10 mm socket spanner and then turn the motor around so that you can access the rear carbon brushes more easily.

- Loosen and remove all four plastic caps (3) using a blade screwdriver.
- Note the fixing position and location of the carbon brushes.

Note
Used carbon brushes need to the refitted exactly in the same position from which they were taken in order to guarantee optimum contact to the collector.

- Make a marking on the motor and the carbon brushes in order to guarantee correct refitting.
- Remove the carbon brushes completely from the mounting (2).
- Check the carbon brush and spring for the level of wear, broken components or discolouration.

Refitting the carbon brushes:

- Depending on the condition of the brush and the spring:
  - either replace the brushes in exactly the same position from which they were taken or
  - fit new brushes.
- Refit the plastic caps and tighten them firmly.
- Turn the motor round in position so that the engaging lever can be set both to the "Push" and the "Travel" position.
- Now retighten the bolt ((5) fingertight.
- Refit the drive wheels as described in chapter 8.10.1.

Note
The following procedure is necessary to run the carbon brushes in after replacement and thus guarantee maximum performance.

WARNING: Risk of accidents!

Hazards to workers, surroundings and mobility device!

- *Do not leave the mobility device unattended during the following procedure!*
- *Secure the area.*

- Lift the wheelchair on one side and place a 14 cm high wooden block underneath it so that the drive wheel is off the ground and can rotate freely. Use proper lifting techniques.
- Also repeat this on the other side of the mobility aid.
- Allow the motors to run for an hour in forward direction.
- Allow the motors to cool down for 30 minutes.
- Allow the motors to run for an hour in reverse direction.
- Lift the mobility aid off the wooden blocks.

8.12 Rear wheel suspension

8.12.1 Replacing the rear wheel suspension

WARNING: Danger of crushing!

The mobility device is very heavy. Injury hazard to hands and feet!

- *Use proper lifting techniques:*

Injury hazard caused by uncontrolled movement of the mobility device!

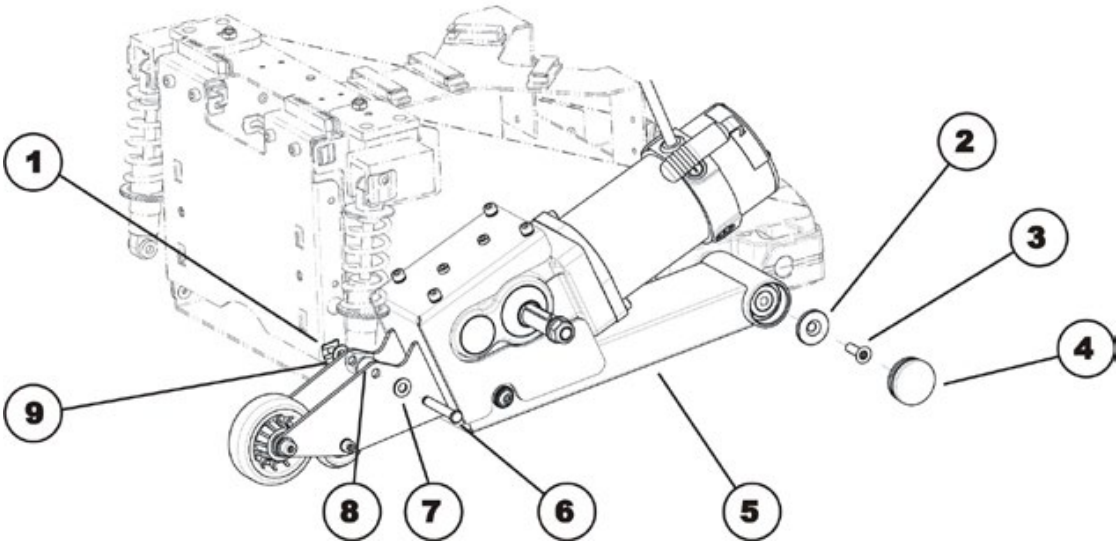
- *Switch the power supply off (ON/OFF key).*
- *Engage the drive.*
- *Before raising the vehicle, secure the wheels by blocking them with wedges.*

Requirements:

- 5 mm Allen key
- 6 mm Allen key
- T40 torx wrench
- 13 mm socket spanner
- 19 mm socket spanner
- blade screwdriver
- long wooden blocks, min. 14 x 14 x 30 cm

Dismantling the wheel suspension:

- Remove the rear and the centre battery compartment cover as described in chapters 8.1.1 and 8.1.2.
- Remove the rear light cover as described in chapter 8.1.4.
- Pull the motor plug out of the power module.
- Open the cable clamps and expose the motor cable.
- Remove the drive wheel as described in chapter 8.10.1.
- Remove the wheel hub as described in chapter 8.10.3.
- Remove the splash guard as described in chapter 8.1.6.
- Remove the motor/transmission unit as described in chapter 8.11.1 or 8.11.3.



- Loosen and remove the nut (1) from the hexagon-socket head bolt (6) on the spring.
- Remove the washer (9).
- Remove the hexagon-socket head bolt (6). In doing so, please pay attention to the washer (8) and the spacer (7).
- Remove the plastic cover (4).
- Loosen and remove the torx screw (3).
- Remove the spacer (2).
- Remove the entire wheel suspension (5) from the axle.

Refitting the wheel suspension:

- Refit the parts in reverse order.
- To conclude, you should always carry out a trial run to test the vehicle functions.

8.13 Replacing the strut

8.13.1 Removing the suspension strut

Note
Invacare® always recommends replacing both struts in order to ensure that the mobility aid works perfectly.

Note (only for Standard Storm⁴)
The springs of the wheel suspension can be chosen from three weight classes according to the users weight.
There different weight classes are marked by dashes on the springs.

1 dash: 0 … 70 kg user weight
2 dash: 71 … 110 kg user weight
3 dash: 111 … 150 kg user weight

WARNING: Danger of crushing!

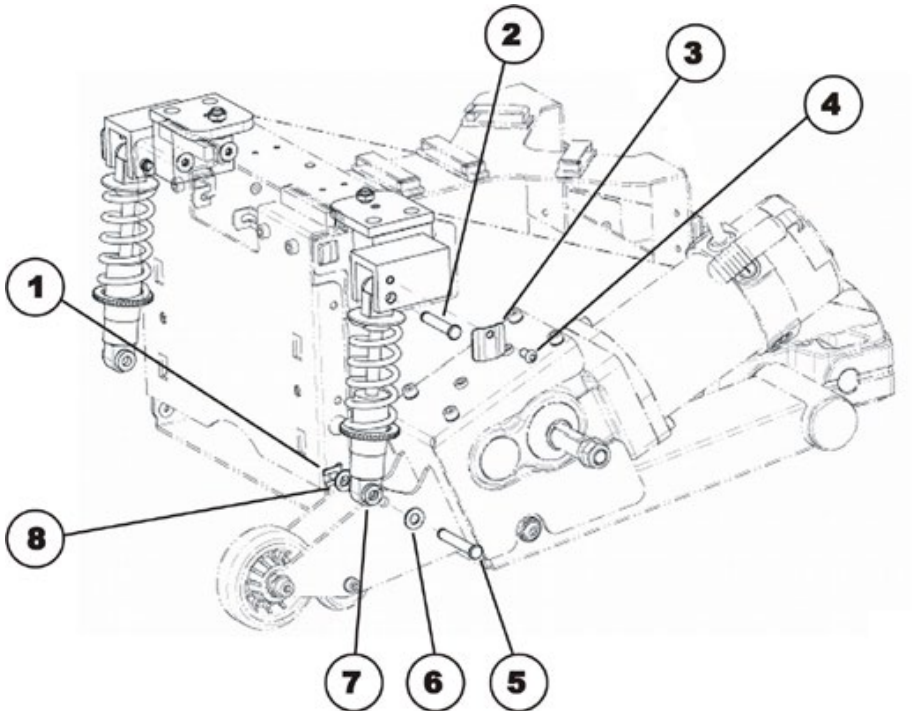
The mobility device is very heavy. Injury hazard to hands and feet!

- *Use proper lifting techniques.*

Injury hazard caused by uncontrolled movement of the mobility device!

- *Switch the power supply off (ON/OFF key).*
- *Engage the drive.*
- *Before raising the vehicle, secure the wheels by blocking them with wedges.*

Requirements:
- 4 mm Allen key
- 6 mm Allen key
- 13 mm socket spanner
- long wooden blocks, min. 14 x 14 x 30 cm



Dismantling the strut:

- Remove the rear and the centre battery compartment cover as described in chapters 8.1.1 and 8.1.2.
- Remove the drive wheel as described in chapter 8.10.1.
- Loosen and remove the nut (1) from the hexagon-socket head bolt (5) on the spring.
- Remove the spacer (8).
- Remove the hexagon-socket head bolt (5). In doing so, please pay attention to the washer (7) and the spacer (6).
- Loosen the Allen screw (4) with a 4 mm Allen key.
- Remove the Allen screw (4) together with the cover plate (3).
- Remove the pin (2). In doing so, please pay attention to the washers and spacers.
- Remove the strut.

Refitting the strut:

- Refit the parts in reverse order.
- To conclude, you should always carry out a trial run to test the vehicle functions.

8.13.2 Replacing the front suspension strut (only Storm⁴ X-plore)

Note
Invacare® always recommends that you replace both suspension struts to ensure perfect mobility device operation.

The springs in the wheel suspension can be selected in two weight classes depending on the weight of the user.
The different weight classes are labelled using coloured dots on the spring.

1 dot: up to kg user weight
4 dots over kg user weight

WARNING: Danger of crushing!

The mobility device is very heavy. Injury hazard to hands and feet!

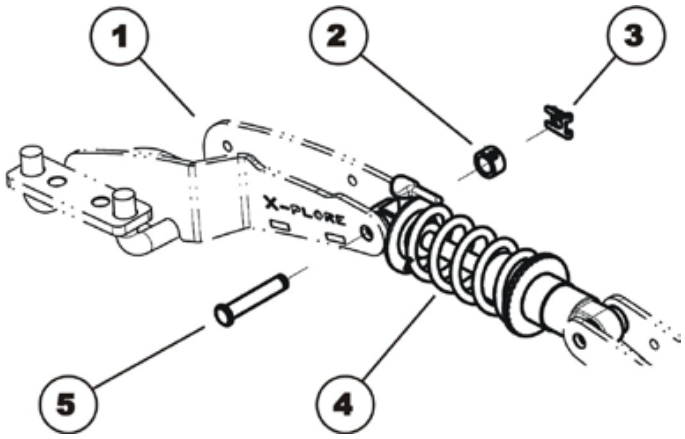
- *Use proper lifting techniques:*

Injury hazard caused by uncontrolled movement of the mobility device!

- *Switch the power supply off (ON/OFF key).*
- *Engage the drive.*
- *Before raising the vehicle, secure the wheels by blocking them with wedges.*

Requirements:

- long wooden blocks, min. 14 x 14 x 30 cm



Dismantling the suspension strut:

- Lift the mobility device onto several wooden blocks. Use proper lifting techniques
- Remove the securing clip (3).
- Remove the spacer (2).
- Carefully remove the bolts (5) which connect the shock absorber (4) to the swing arm (1).
- Repeat this procedure for the rear bolts
- Remove the suspension strut.

Refitting the suspension strut:

- Replace the parts in the reverse order.
  Always ensure that the suspension strut has been located correctly. The spring plates for setting the spring preload must be at the rear. The lever for setting the shock absorption must be at the top.
- To conclude, you should always carry out a trial run to test the vehicle functions.

8.14 Seat system

It can be used the seat system standard or Modulite, see chapter 10 "Adjusting the seating position".

8.14.1 Seat support and tilt module

8.14.1.1 Replacing the seat support with manual tilt module (till Dec. 2010)

WARNING: Danger of crushing!

The seat/seat support is very heavy. Injury hazard to hands and feet!

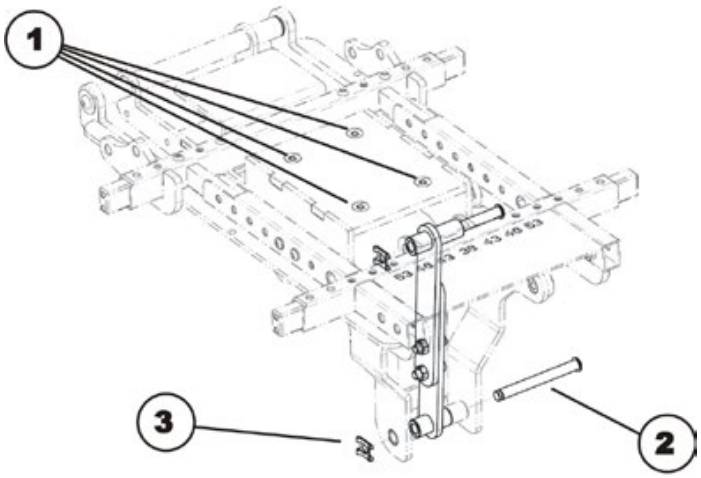
- *Use proper lifting techniques.*

Requirements:

- T40 torx wrench
- oblique pliers
- cable ties

Dismantling the seat support:

- Remove the legrests.
- Remove the armrests.
- Remove the seat cushion.
- Remove any existing cable ties holding the cables on the remote or lighting. Remove the cables from the stuck on clamps.
- Loosen the cap nuts of the headlight mountings using an 8 mm jaw spanner (see chapter 8.7.7 or 8.7.9).
- Put the headlight and the mounting in a safe place on the rear part of the battery compartment cover.
- Remove the connecting cable to the chassis from the remote or from the optional actuator module.
- Remove the cable or cables so that there is no longer any cable connection between the seat and the chassis.



- Remove the pin retainer (3).
- Remove the pin (2).
- Fold back the entire seat.
- Keep a firm hold on the seat and the seat support whilst loosening and removing the four torx screws (1).
- Lift the seat and the seat support from the vertical column.

Refitting the seat carrier:

- Refit the parts in reverse order.
- To conclude, check all the mobility aid functions.

8.14.1.2 Replacing the seat frame with a manual tilt module (from Dec. 2010)

CAUTION: Danger of crushing!

The seat/seat support are very heavy. Injury hazard to hands and feet!

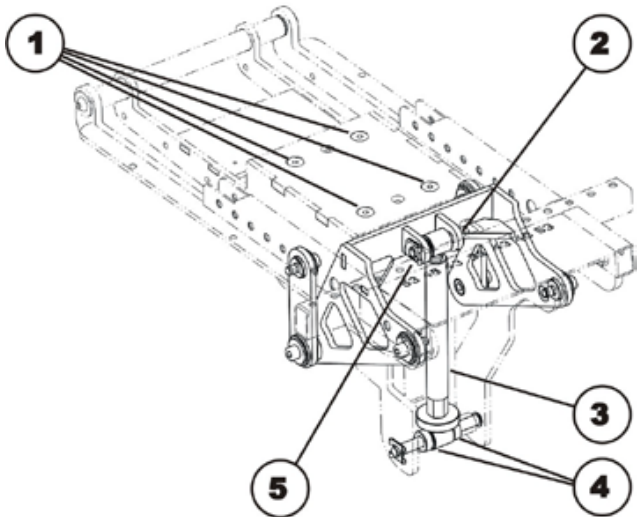
- *Use proper lifting techniques.*

Requirements:

- T40 torx wrench
- oblique pliers
- cable ties

Dismantling the seat support:

- Remove the legrests.
- Remove the armrests.
- Remove the seat cushion.
- Remove any existing cable ties holding the cables on the remote or lighting. Remove the cables from the stuck on clamps.
- Loosen the cap nuts of the headlight mountings using an 8 mm jaw spanner (see chapter 8.7.7 or 8.7.9).
- Put the headlight and the mounting in a safe place on the rear part of the battery compartment cover.
- Remove the connecting cable to the chassis from the remote or form the optional actuator module.
- Remove the cable or cables so that there is no longer any cable connection between the seat and the chassis.



- Remove the pin retainer (5).
- Remove the bolt (2) and swing the tilt adjustment assembly (3) forward. If you loosen the lower bolts also, for example to replace the tilt adjustment, pay attention to the two distance washers (4).
- Fold back the entire seat.
- Keep a firm hold on the seat and the seat support whilst loosening and removing the four torx screws (1).
- Lift the seat and the seat support from the vertical column.

Refitting the seat carrier:

- Refit the parts in reverse order.
- To conclude, check all the mobility aid functions.

8.14.1.3 Replacing the seat support with electric tilt module

CAUTION: Danger of crushing!

The seat/seat support are very heavy. Injury hazard to hands and feet!

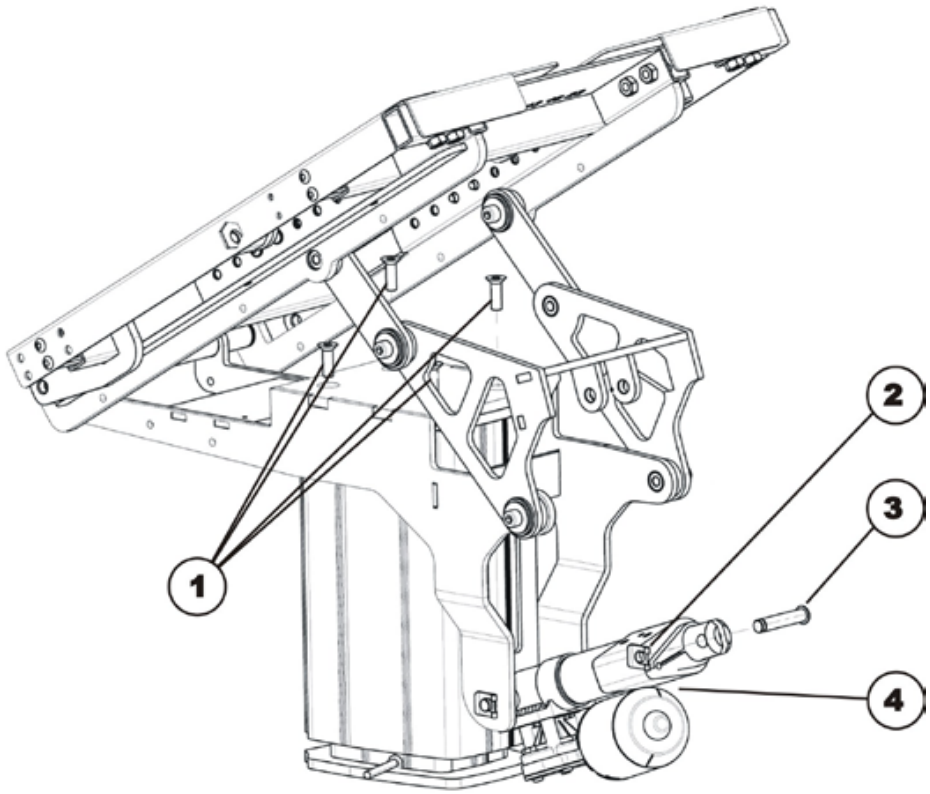
- *Use proper lifting techniques.*

Requirements:

- T40 torx wrench
- oblique pliers
- cable ties

Dismantling the seat support:

- Remove the legrests.
- Remove the armrests.
- Remove the seat cushion.
- Remove any existing cable ties holding the cables on the remote or lighting. Remove the cables from the stuck on clamps.
- Loosen the cap nuts of the headlight mountings using an 8 mm jaw spanner (see chapter 8.7.7 or 8.7.9).
- Put the headlight and the mounting in a safe place on the rear part of the battery compartment cover.
- Remove the connecting cable to the chassis from the remote or form the optional actuator module.
- Remove the cable or cables so that there is no longer any cable connection between the seat and the chassis.



- Remove the pin retainer (2).
- Remove the pin (3) and tip the tilt actuator (4) forward.
- Fold back the entire seat.
- Keep a firm hold on the seat and the seat support whilst loosening and removing the four torx screws (1).
- Lift the seat and the seat support from the vertical column.

Refitting the seat carrier:

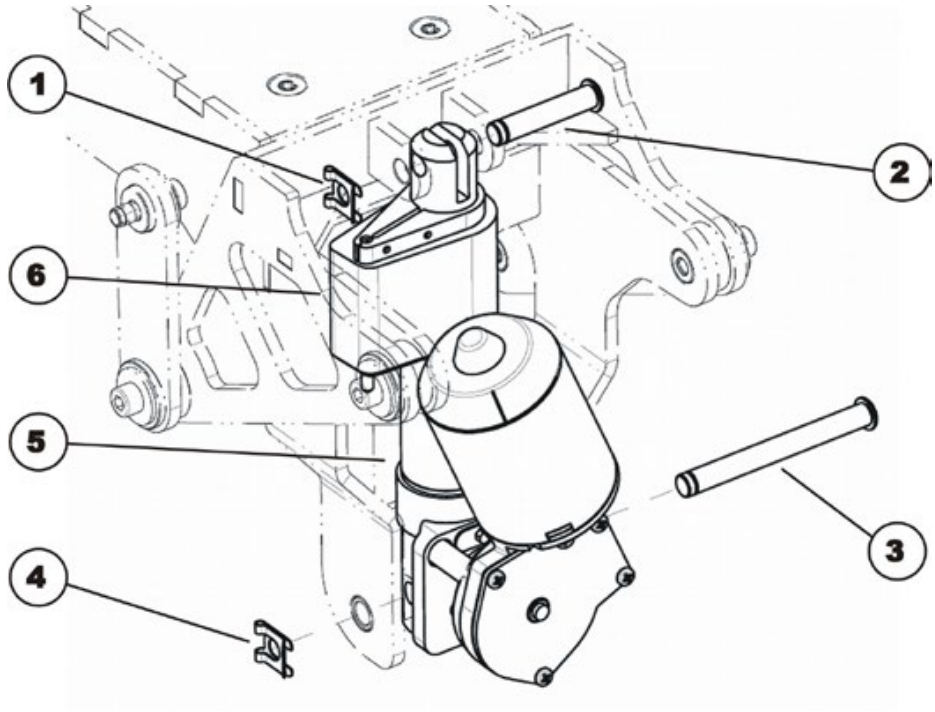
- Refit the parts in reverse order.
- To conclude, check all the mobility aid functions.

8.14.1.4 Replacing the tilt actuator

Requirements:
- Oblique pliers
- Cable ties

Dismantling the tilt actuator:

- Remove the legrests.
- Pull the tilt actuator plug out of the actuator module under the seat
- Unclip the cable. Remove any cable ties which are fitted.



- Remove the upper pin retainer (1).
- Remove the upper pin (2) and tip the tilt actuator forward (5).
- Remove the lower pin retainer (4).
- Remove the lower pin (3) and remove the entire tilt actuator.
- Replace the tilt actuator.

Refitting the tilt module:

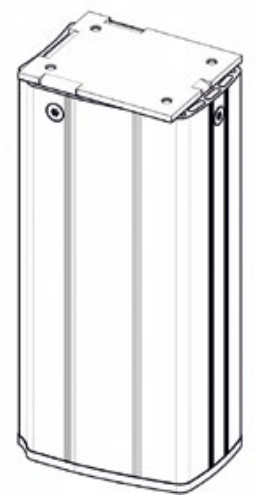
- Refit the parts later in reverse order.
- To conclude, check all the mobility aid functions.

8.14.2 Seat column / lifter column

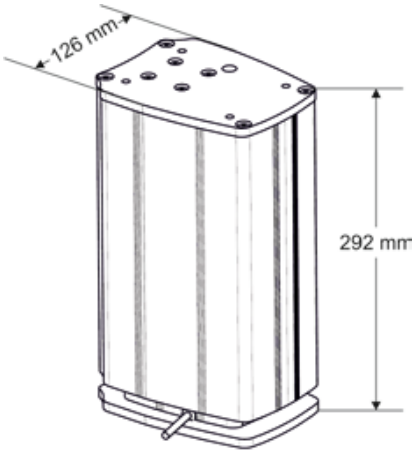
Overview of the column types

Following column types can be installed:

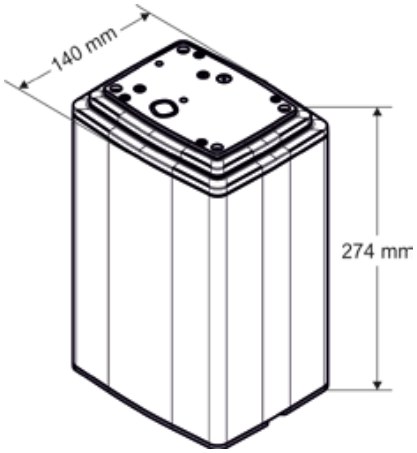
Seat column



Lifter column type A
electrically adjustable



Lifter column type B
electrically adjustable



8.14.2.1 Replacing the seat column

WARNING: Danger of crushing!
The seat is very heavy. Injury hazard to hands and feet!
- *Use proper lifting techniques.*

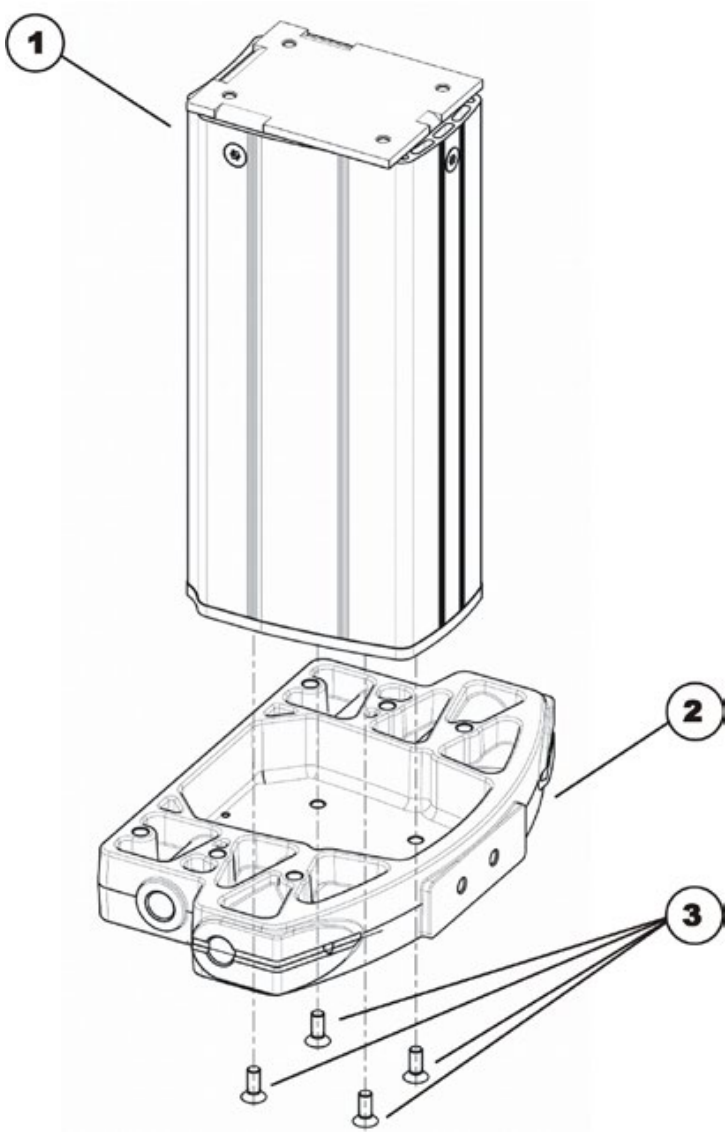
WARNING: Danger of crushing!
The mobility device is very heavy. Injury hazard to hands and feet!
- *Use proper lifting techniques.*

Injury hazard caused by uncontrolled movement of the mobility device!
- *Switch the power supply off (ON/OFF key).*
- *Engage the drive.*
- *Save the vehicle laid on its side against overturning.*

Requirements:
- 4 mm Allen key
- T40 torx wrench
- Oblique pliers
- Cable ties

Dismantling the lifting column:

- Remove the rear battery compartment cover as described in chapter 8.1.1.
- Remove the centre battery compartment cover as described in chapter 8.1.2.
- Remove the front battery compartment cover as described in chapter 8.1.3.
- Remove the seat as described in chapter 8.14.1.1 or 8.14.1.3 respectively.
- Place the mobility aid on its side and safeguard it against overturning. Use proper lifting techniques.

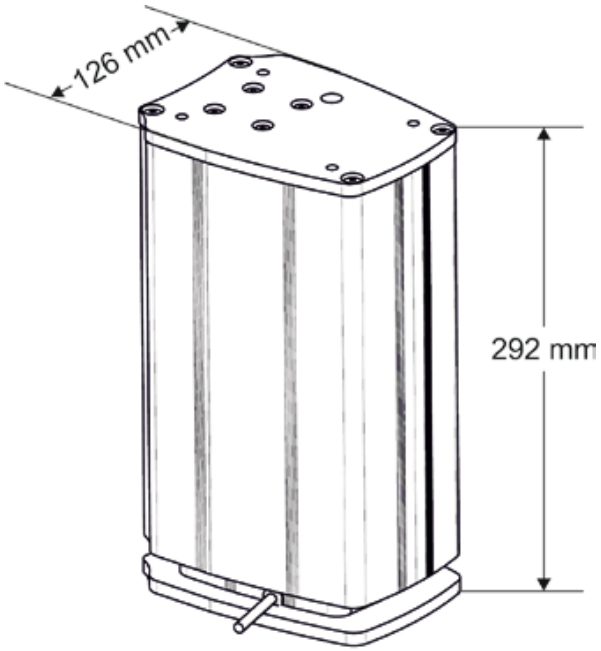


- Loosen and remove the four torx screws (3) on the underside of the chassis (2).
- Remove the lifting column (1).

Refitting the lifting column:

- Refit the parts in reverse order.
- To conclude, check all the mobility aid functions.

8.14.2.2 Replacing a type A electrical lifter column



WARNING: Danger of crushing!
The seat is very heavy. Injury hazard to hands and feet!
- *Use proper lifting techniques.*

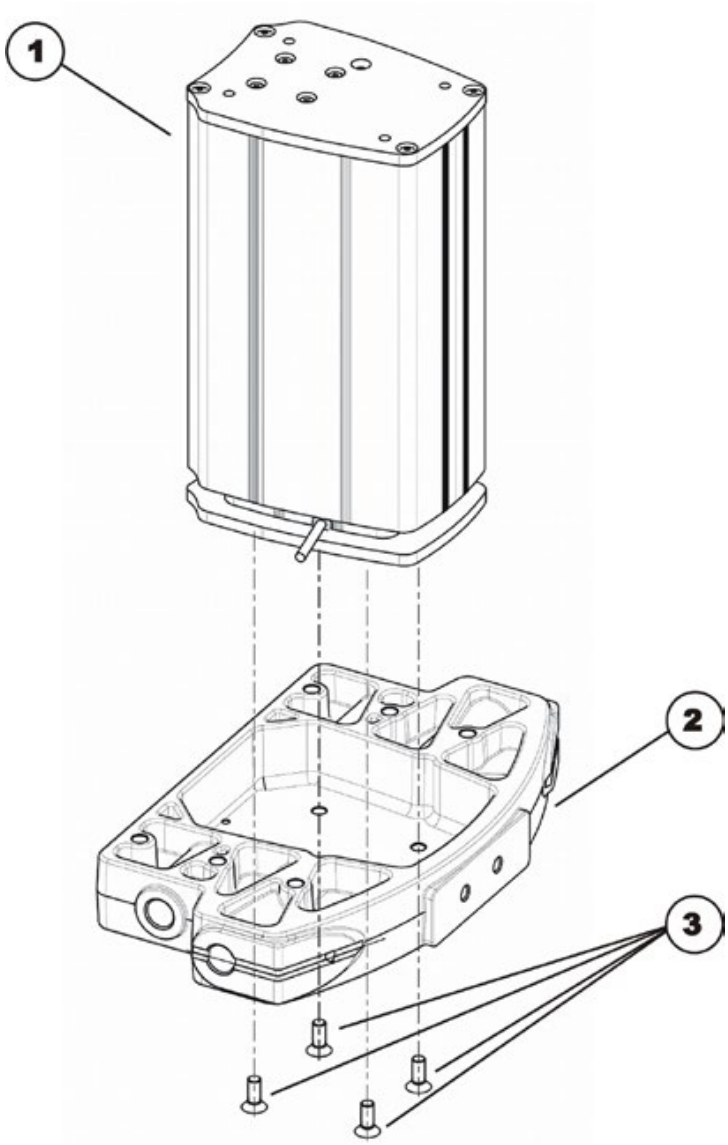
WARNING: Danger of crushing!
The mobility device is very heavy. Injury hazard to hands and feet!
- *Use proper lifting techniques.*

Injury hazard caused by uncontrolled movement of the mobility device!
- *Switch the power supply off (ON/OFF key).*
- *Engage the drive.*
- *Save the vehicle laid on its side against overturning.*

Requirements:
- 4 mm Allen key
- T40 torx wrench
- Oblique pliers
- Cable ties

Dismantling the lifting column:
- Remove the rear battery compartment cover as described in chapter 8.1.1.
- Remove the centre battery compartment cover as described in chapter 8.1.2.
- Remove the front battery compartment cover as described in chapter 8.1.3.
- Remove the seat as described in chapter 8.14.1.1 or 8.14.1.3 respectively.
- Disconnect the cable of the lifter column from the actuator module on the battery box.
- Open the cable clamps and expose the cable.

- Place the mobility aid on its side and safeguard it against overturning. Use proper lifting techniques.

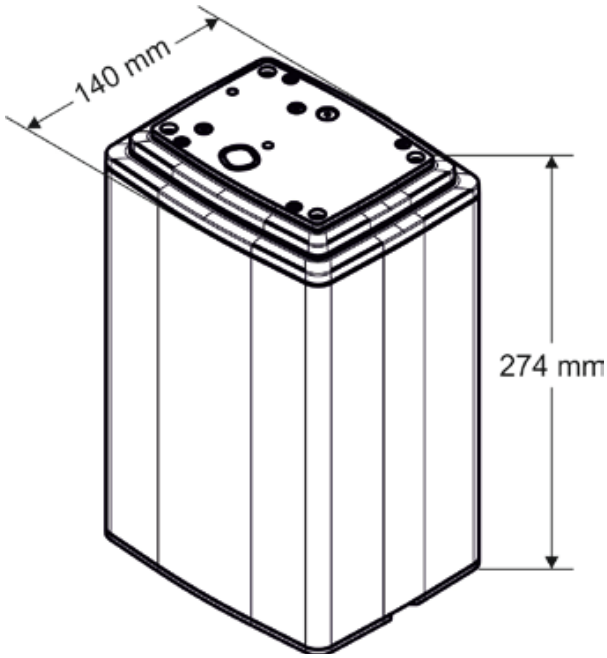


- Loosen and remove the four torx screws (3) on the underside of the chassis (2).
- Remove the lifting column (1).

Refitting the lifting column:

- Refit the parts in reverse order.
- To conclude, check all the mobility aid functions.

8.14.2.3 Replacing a type B electrical lifter column



WARNING: Danger of crushing!

The seat is very heavy. Injury hazard to hands and feet!

- *Use proper lifting techniques.*

WARNING: Danger of crushing!

The mobility device is very heavy. Injury hazard to hands and feet!

- *Use proper lifting techniques.*

Injury hazard caused by uncontrolled movement of the mobility device!

- *Switch the power supply off (ON/OFF key).*
- *Engage the drive.*
- *Save the vehicle laid on its side against overturning.*

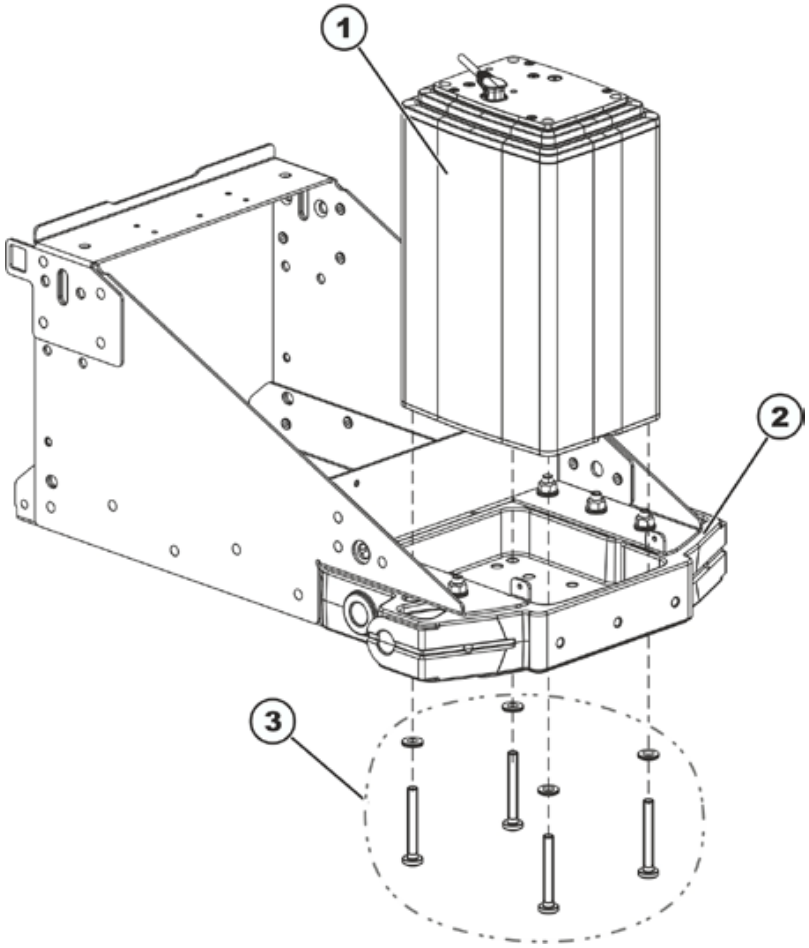
Requirements:

- 4 mm Allen key
- T40 torx wrench
- Oblique pliers
- Cable ties
- Torque wrench 5 – 30 Nm (or similar)

Dismantling the lifting column:

- Remove the rear battery compartment cover as described in chapter 8.1.1.
- Remove the centre battery compartment cover as described in chapter 8.1.2.
- Open the cable clamps on the battery box and expose the cables.
- Disconnect the cables on the actuator module on the battery box and, if necessary, on the lighting circuit board.
- Disconnect the plug at the top of the lifter column.

- Remove the seat, as described in chapter 8.14.1.1, 8.14.1.2 and 8.14.1.3, but without removing the cables on the seat frame.
- Place the mobility aid on its side and safeguard it against overturning. Use proper lifting techniques.



- Loosen and remove the four torx screws (3) on the underside of the chassis (2).
- Remove the lifting column (1).

Refitting the lifting column:

CAUTION!

Damage to the lifter column possible! Using incorrect screws or inserting and tightening the screws incorrectly will damage the lifter column.

The lifter column is supplied with self-tapping screws. The screws are used on the underside as well as on the upper side.

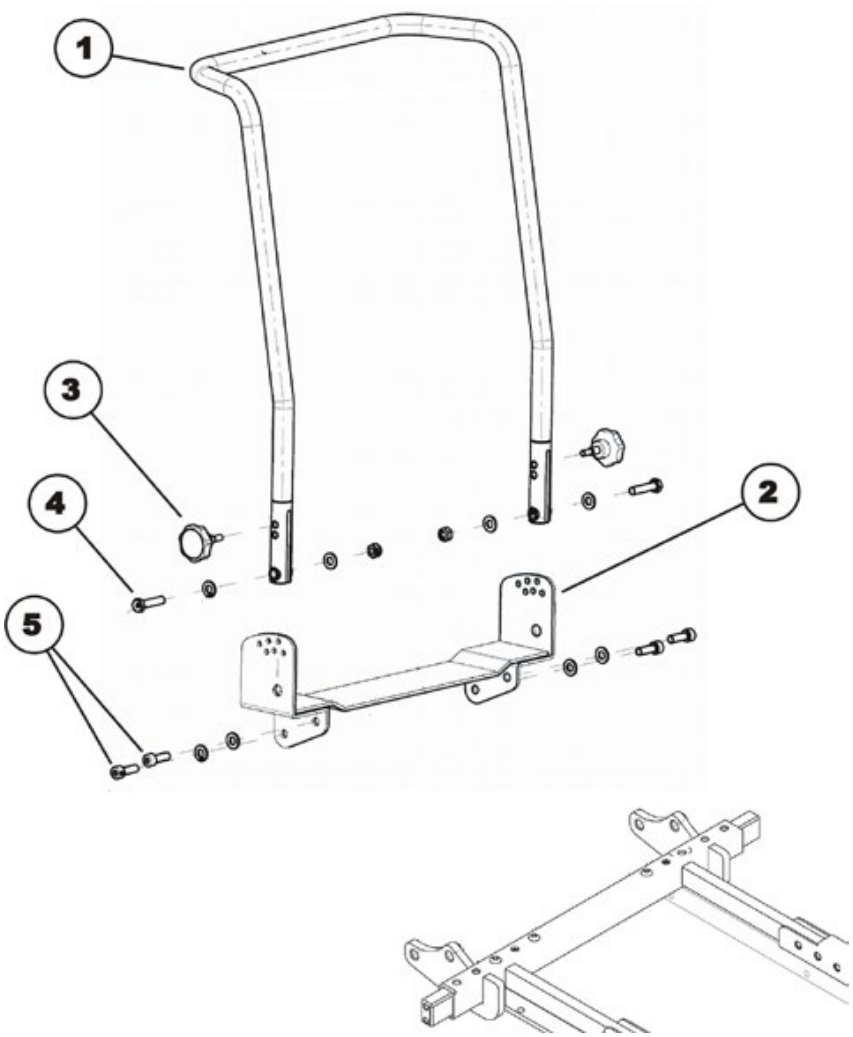
- *Use only the screws provided.*
- *If the screws were already screwed in: When reinstalling the screws, make sure that they are screwed carefully into the existing thread.*
- *Tighten the screws to a torque of 15-17 Nm.*

- Refit the parts in reverse order.
- Install the cables, as described in chapter 8.6.2.
- To conclude, check all the mobility aid functions.

8.15 Back unit

8.15.1 Replacing the standard back

Requirements:
- 5 mm Allen key
- socket spanner, 13 mm



Dismantling the back unit:

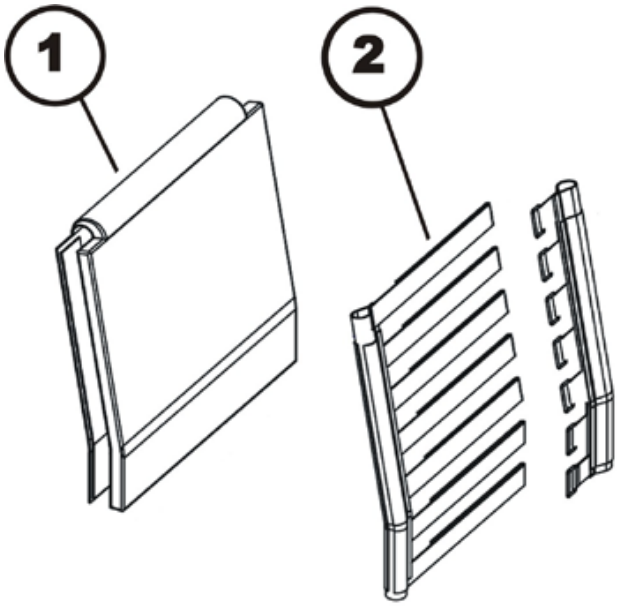
- Remove the back cushion.
- Loosen and remove the handwheels (3) and the Allen screws (4) including the washers on the left and right side of the mobility aid.
- Carefully remove the rear pipe (1) of the back bracket (2).
- If the backrest holders also need to be replaced: undo and remove the Allen screws (5) including the washers on the left-hand and right-hand side of the chair.

Refitting the back unit:

- Refit the parts in reverse order.
- To conclude, check all the mobility aid functions.

8.15.2 Adjusting the belt back

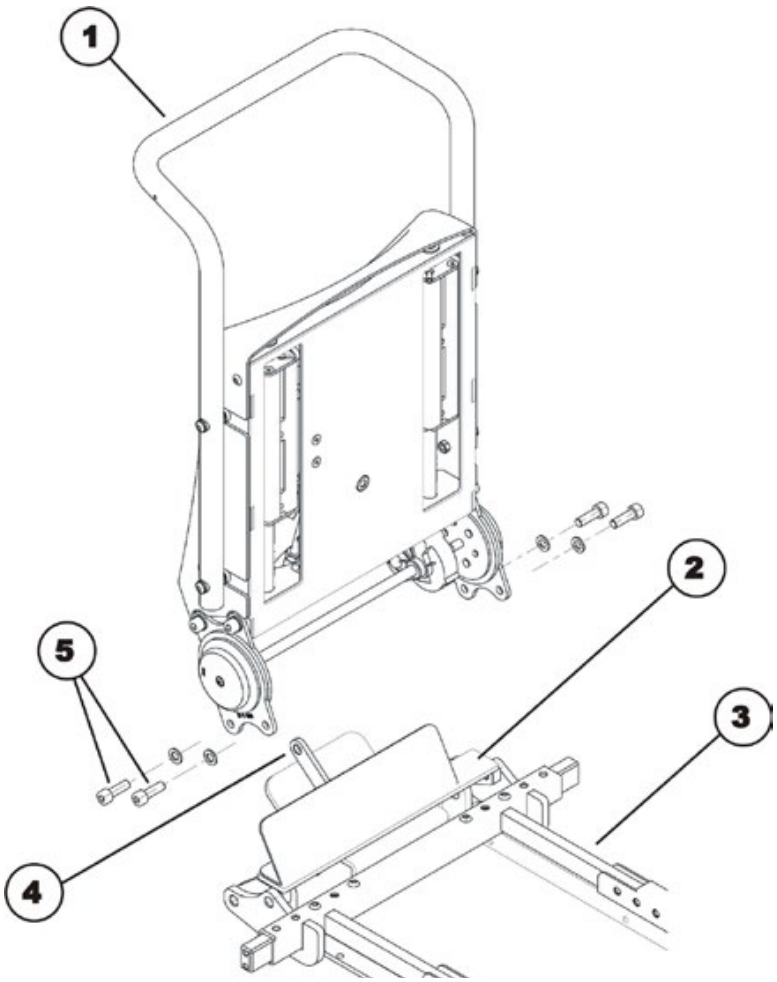
The belt back can be individually adapted to the back shape of the user.



- Pull apart the front and back of the back cushion (1) and remove it. Front and back of the back cushion is held together by Velcro.
- Open Velcro straps of the back straps (2) and set it to the desired length.
- Refit the back cushion and fasten with Velcro.

8.15.3 Replacing the EasyAdapt back

Requirements:
- 5 mm Allen key
- Oblique pliers
- Cable ties



Dismantling the back unit:

- Remove the back cushion.
- Pull the actuator cable out of the actuator module under the seat.
- Pull the cable out of the mobility aid. Remove any cable ties which are fitted.
- Loosen and remove the Allen screws (5) incl. the washers on the left and right side of the seat.
- Carefully remove the back section (1) together with the lower part (2) from the seat support (3). The two parts are interconnected via the arm (4).

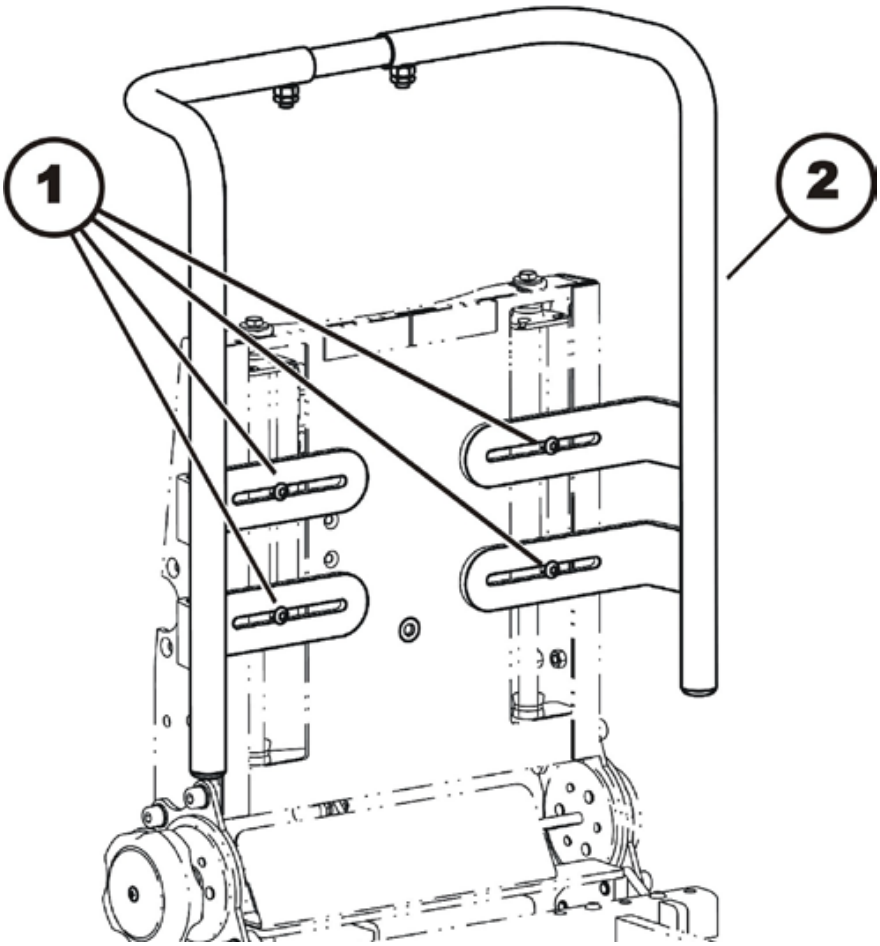
Refitting the back unit:

- Refit the parts in reverse order.
- To conclude, check all the mobility aid functions.

8.15.4 Replacing / adjusting the universal backrest frame for the EasyAdapt backrest

Requirements:
- Measuring tape
- Adhesive tape
- 13 mm open-end wrench
- 4 mm Allen key
- 5 mm Allen key
- Phillips screwdriver, size 2

Uninstalling the universal backrest frame:



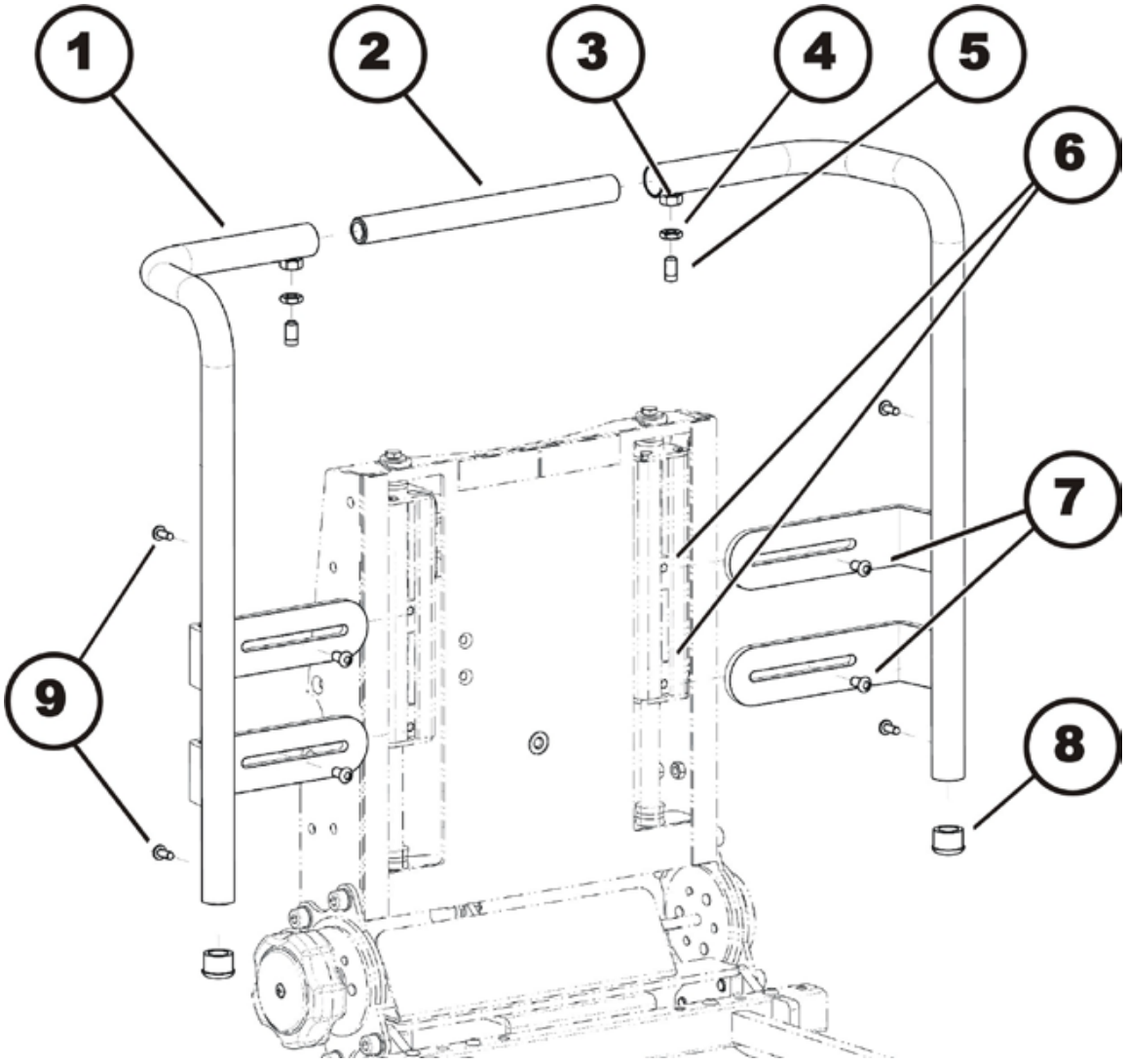
- Remove the backrest cushion.
- Loosen and remove the four Allen screws (1) with a 5 mm Allen key.
- Remove the universal backrest frame (2) from the EasyAdapt backrest.

Installing and adjusting the universal backrest frame:

CAUTION!

The upholstery may get damaged.

- *When adjusting the backrest frame, make sure the upholstery cannot collide with other components.*



- Position both of the protective caps (8) in the lower ends of the lateral tubes (1).
- Mark the center of the middle tube (2) with a piece of adhesive tape.
- Insert the middle tube into the upper ends of the lateral tubes.
- Position the lateral tubes of the EasyAdapt backrest so that the four Allen screws (7) can be screwed into the slot nuts (6) through the oblong holes. Tighten the Allen screws just tight enough that the lateral tubes can slide and be adjusted without difficulty.
- Adjust the distance between the lateral tubes to the desired value using the measuring tape. Make sure both lateral tubes are at an equal distance to the center of the seat.
- Tighten the four Allen screws (7) using a 5 mm Allen key.
- Adjust the middle tube (2) so it is well centered.

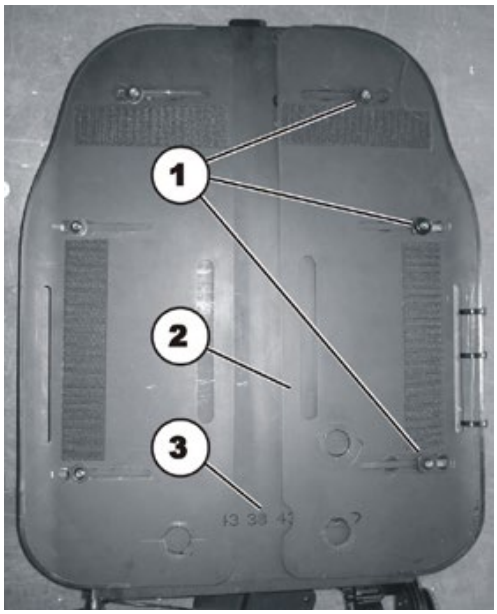
- Screw both of the threaded pins (5) into the threaded holes (3) with a 4 mm Allen key.
- Secure the threaded pins additionally with the counter nuts (4). Tighten the counter nuts hand-tight with a 13 mm open-end wrench.
- Screw the four Phillips screws (9) into the drill holes provided for this purpose on the backs of the tubes. The screws serve as limiters and prevent the backrest from sliding down too far.
- Remove the marking from the middle tube.

8.16 Back unit with ergonomic length adjustment

8.16.1 Adjusting the width

Note
Please also observe preceding chapter 10.3.1 on “adjusting the seat width”.
By default the seat can be adjusted in width between 38 and 53 cm.

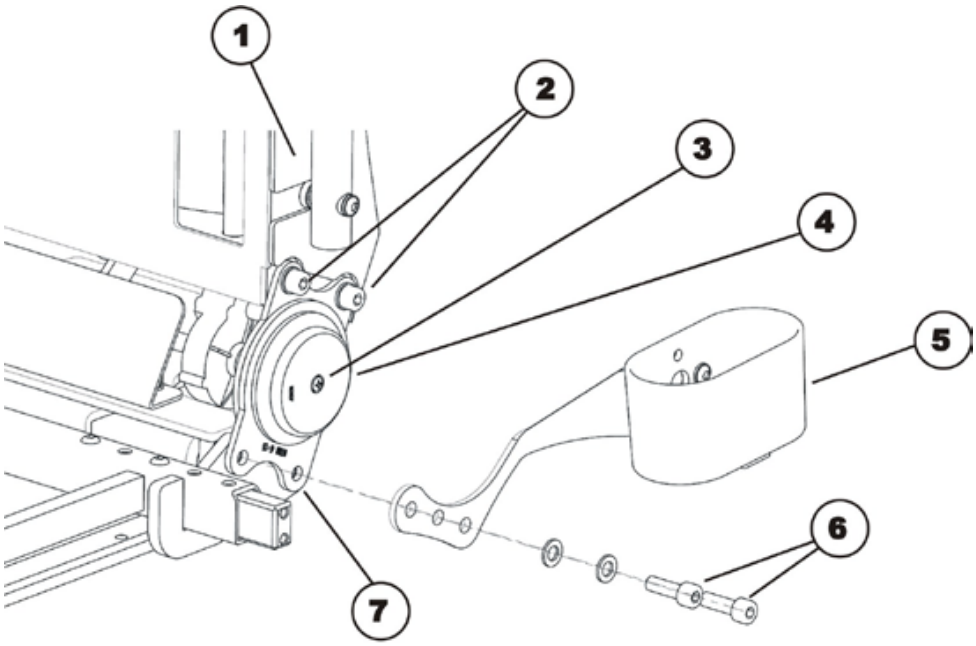
Requirements:
- 4 mm Allen key



- Remove the back cushion.
- Loosen the three Allen screws (1) but do not remove them completely.
- Move the plate (2) until the desired width in centimetres can be read off the scale (3).
- Tighten the three Allen screws.
- Repeat this work step on the other back plate.
- Fit a back cushion in the appropriate width.

8.16.2 Replacing the planetary gear

Requirements:
- 4 mm Allen key
- 5 mm Allen key
- 13 mm jaw spanner
- Size 2 Phillips recessed head spanner
- Snap ring pliers



Dismantling the planetary gear:

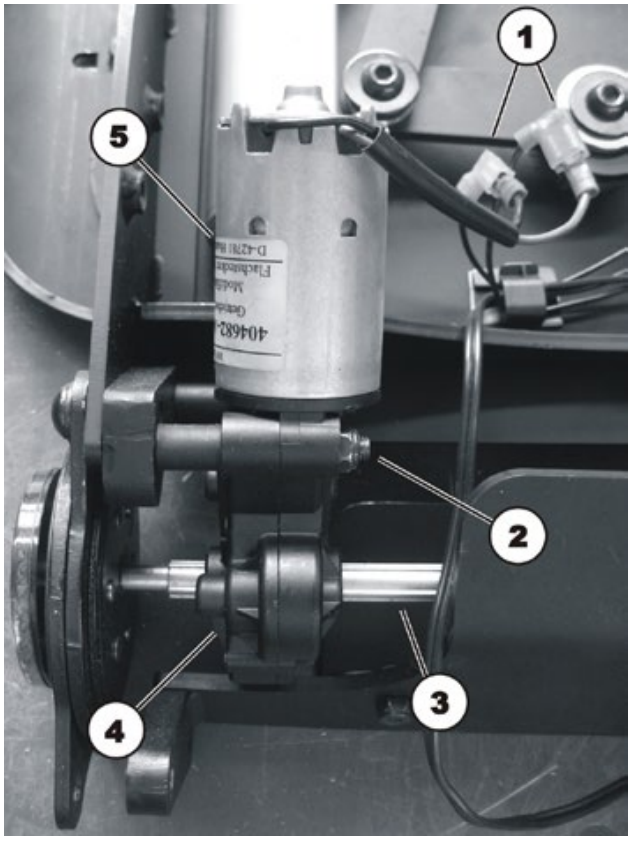
- Loosen and remove the four Allen screws on the plastic cover (1) using a 4 mm Allen key.
- Remove the plastic cover.
- Loosen and remove the Phillips screw (3).
- Remove the reflector (4).
- Remove the snap ring under the reflector (not in the picture).
- Undo the two Allen screws (6) with a 5 mm Allen key.
- Remove the Allen screws (6) incl. the washers and the stick holder (5) if necessary.
- When replacing both planetary gears or dismantling the entire back section, also now loosen and remove the Allen screws (6) incl. the washers on the other side of the mobility aid.
- Undo the two Allen screws (2) with a 5 mm Allen key. You will need an additional 13 mm jaw spanner for the opposite nut on the right side of the mobility aid.
- Remove the Allen screws (2) incl. the washers and the nut if necessary.
- Pull the planetary gear from the axle.
- Replace the planetary gear.

Refitting the planetary gear:

- Refit the parts in reverse order.
- To conclude, check all the mobility aid functions.

8.16.3 Replacing the servo motor

Requirements:
- 4 mm Allen key
- 5 mm Allen key
- 10 mm socket spanner
- 13 mm jaw spanner
- Size 2 Phillips recessed head spanner
- Snap ring pliers



Fitting the planetary gear:

- Disconnect the two motor plugs (1).
- Dismantle the entire back section and remove both planetary gears as described in chapter 8.16.2.
- Loosen and remove the two nuts (2): only the upper nut is visible in the illustration.
- The motor (5) and the gear (4) form one unit. Pull them from the axle together (3).
- Replace the motor/gear unit.

Refitting the planetary gear:

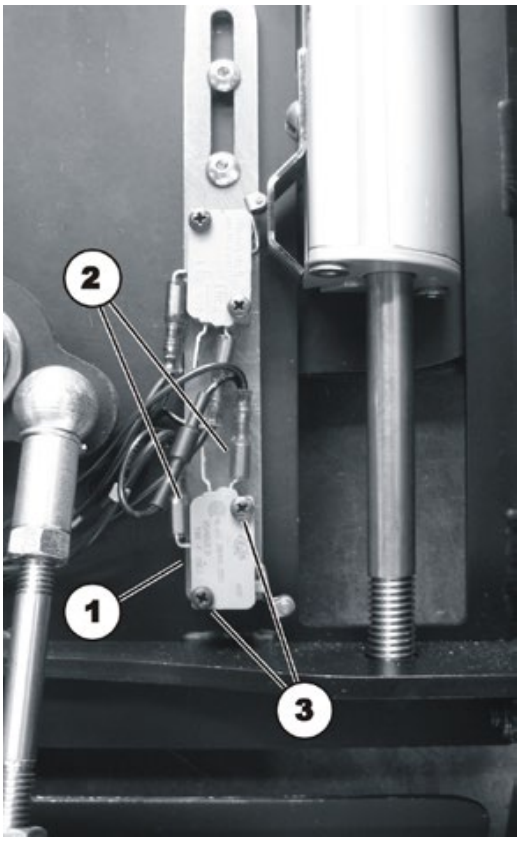
- Refit the parts in reverse order.
- To conclude, check all the mobility aid functions.

8.16.4 Replacing the microswitch

Requirements:
- 4 mm Allen key
- Size 2 Phillips recessed head spanner

Dismantling the microswitch:

- Loosen and remove the four Allen screws on the backrest plastic cover using a 4 mm Allen key.
- Remove the plastic cover.



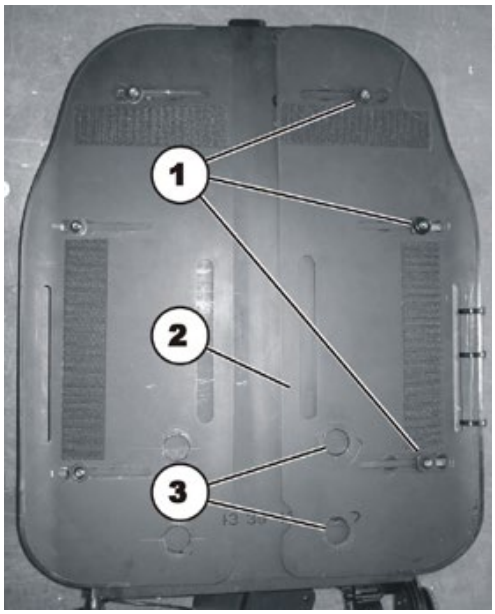
- Pull the plugs (2) out of the microswitch (1).
- Loosen and remove the two Phillips screws (3)
- Replace the microswitch.

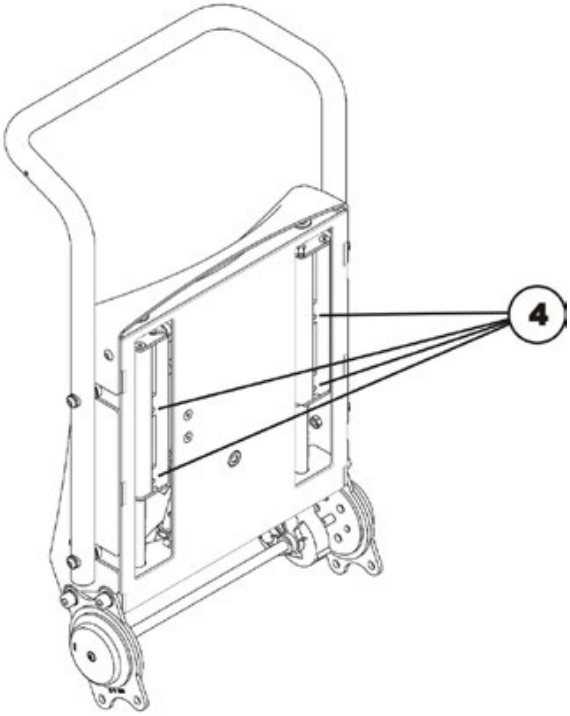
Refitting the planetary gear:

- Refit the parts in reverse order.
- To conclude, check all the mobility aid functions.

8.16.5 Fitting back plates to the base support of the back with ergonomic length adjustment

Requirements:
- 4 mm Allen key

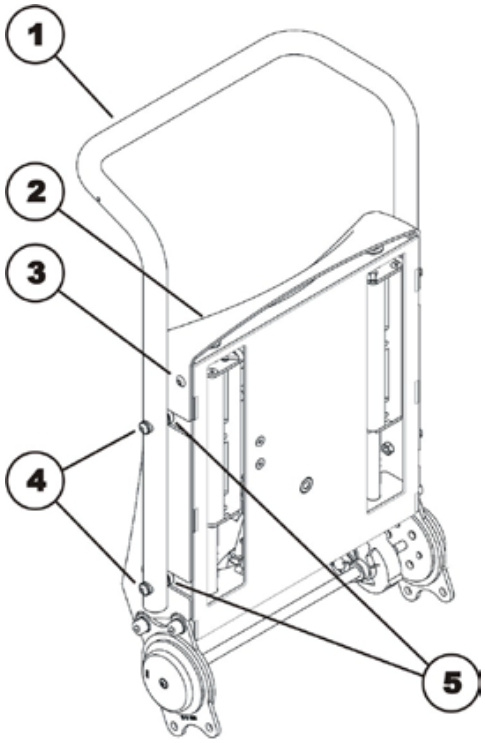




- Loosen the three Allen screws (1) but do not remove them completely.
- Move the back plate (2) so that the large boreholes (3) are above the lower screw holes of the centre back plate.
- Tighten the three Allen screws slightly.
- Repeat this on the second back plate.
- Move the back of the seat to the rearmost position.
- Slide the two lower slot nuts (4) in the left hand and right hand groove right down to the bottom.
- Push the upper ones so far to the top that the distances of the slot nuts coincide with the distances of the screw holes.
- Place the centre part of the back plate (3) on the backrest so that the four boreholes coincide with the slot nuts (4).
- Fit the four supplied Allen screws and tighten them.
- Adjust the desired seat width with the help of the included centimetre scale.
- Tighten the six Allen screws (1) firmly.

8.16.6 Fitting the handlebar

Requirements:
· 4 mm Allen key



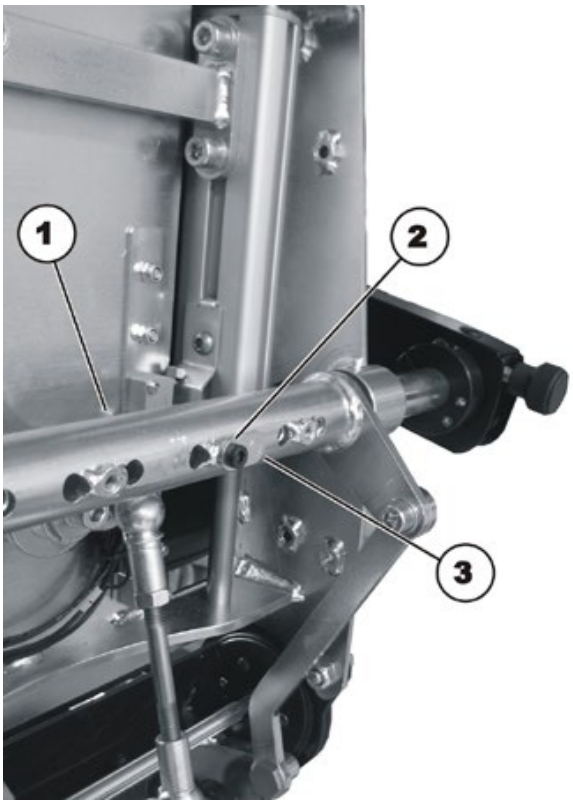
· Loosen and remove the four Allen screws (3) on the plastic cover.
· Remove the plastic cover (2).
· Remove the covers on the washer recesses (5).
· Arrange the handlebar (1) on the back section in such a way that the boreholes coincide with the tapped holes in the back section.
· Fit the four Allen screws (4) incl. the washers (5) and tighten the screws.
· Refit the plastic cover.
· Refit the six Allen screws (3) and tighten them.

8.16.7 Replacing the travelling armrest

Requirements:
- 4 mm Allen key

Dismantling the travelling armrest

- Undo and remove the four Allen screws in the backrest plastic cover using a 4 mm Allen key.
- Remove the plastic cover.
- If necessary, remove the remote together with its cable.



- On the torque support, loosen the locating pin (3) bolt (2) with a 4 mm Allen key.
- Raise the armrest slightly and remove the locating pin.
- Pull the armrest out of the torque support to the side. If you raise and lower the armrest a few times it is easier to remove.
- Replace the armrest.

Refitting the travelling armrest

- Replace the parts in the reverse order.
- To complete, check all vehicle functions.

The new armrest will need to be adjusted to suit the user. Please refer to the mobility device operating manual for detailed information.

8.16.8 Replacing the arm support on the travelling armrest

Requirements:
- 4 mm Allen key

Dismantling the arm support

- If necessary, remove the remote together with its cable.
- Rotate the armrest upwards.

- Undo the two holding bolts (1) with a 4 mm Allen key.
- Replace the arm support.

Refitting the travelling armrest

- Replace the parts in the reverse order.
- To complete, check all vehicle functions.

The new armrest will need to be adjusted to suit the user. Please refer to the mobility device operating manual for detailed information.

8.16.9 Retrofitting a travelling armrest

NOTE
The travelling armrest can only be retrofitted if the entire backrest is replaced since the torque support must be fitted with the correct guides.

Retrofitting the travelling armrest

- Fit the backrest for the travelling armrest as described in chapter 8.15.3.
- Fit the armrests as described in chapter 8.16.7.
- Fit the arm supports as described in chapter 8.16.8.

The new armrest will need to be adjusted to suit the user. Please refer to the mobility device operating manual for detailed information.

8.17 Back Unit Modulite

8.17.1 Replacing the standard backrest

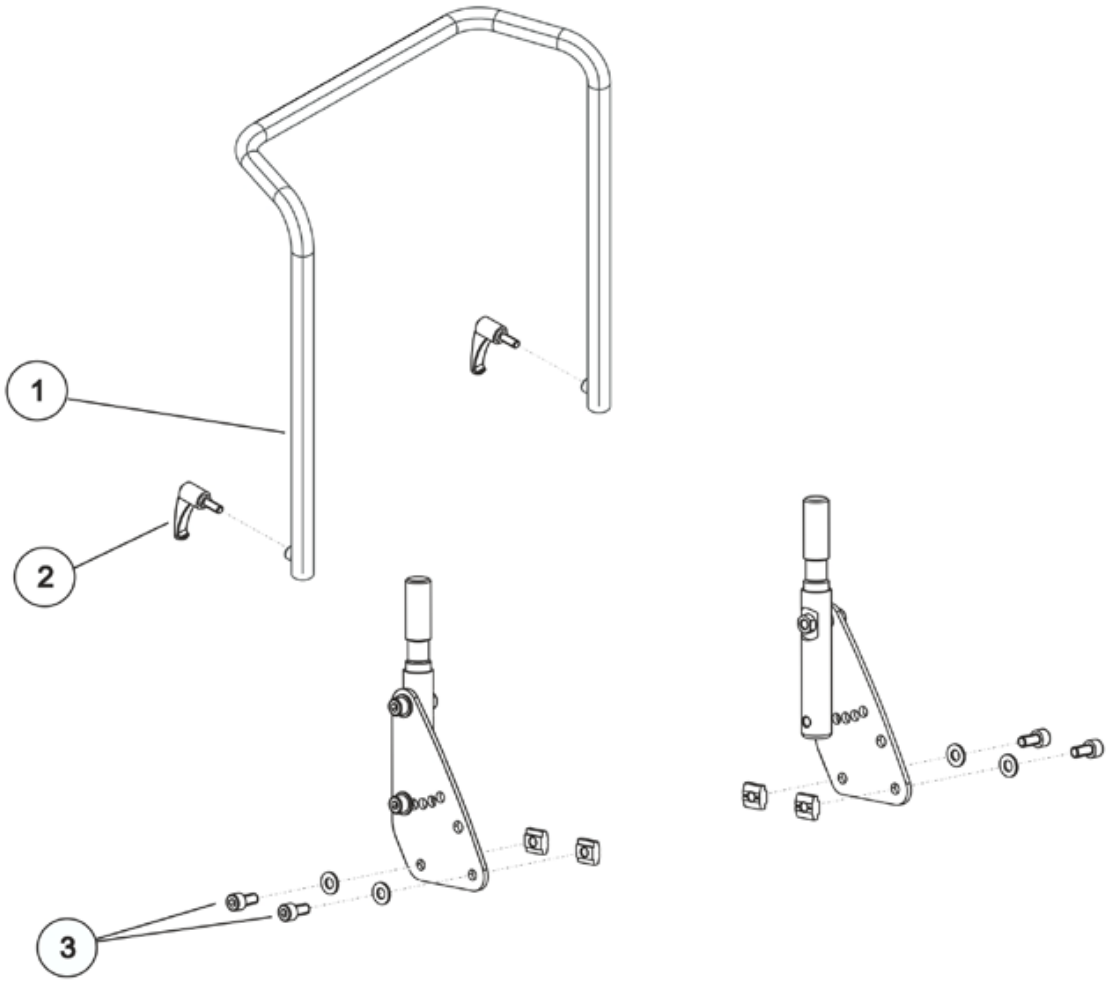
Requirements:
· 5 mm Allen key

Dismantling the backrest unit:

· Remove the backrest cushion.

· Loosen the fixation lever (2) of the backrest tube.

· Remove the backrest tube.



· Use the Allen key to loosen and remove the hexagon socket head screws (3) including the nuts and washers on the left and right side of the chair.

Refitting the backrest unit:

· Replace the parts in the reverse order.

· To conclude, you should always carry out a trial run to test the vehicle functions.

8.17.2 Replacing the backrest mounting bracket

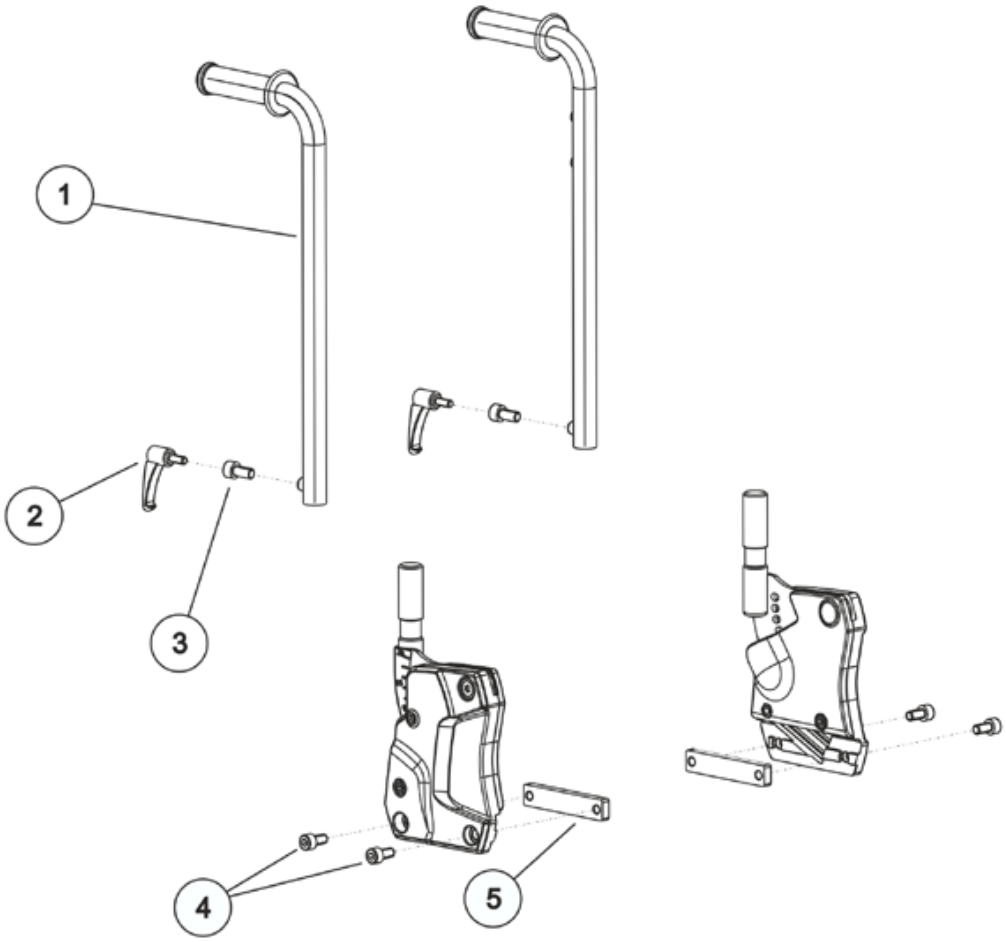
Requirements:
· 5 mm Allen key

Dismantling the backrest unit:

· Remove the backrest cushion.

· Loosen the fixation levers (2) of the corresponding backrest tube (1), depending on the version.
There are two versions:
(2) - for the manual backrest
(3) - for the electrically adjustable backrest

· Remove the backrest tube.



· Loosen and remove the two hexagon socket head screws (4) to the sliding block (5) on the left and right side of the chair.

Refitting the backrest unit:

· Replace the parts in the reverse order.

· To conclude, you should always carry out a trial run to test the vehicle functions.

8.17.3 Replacing the backrest mounting bracket for SB 53

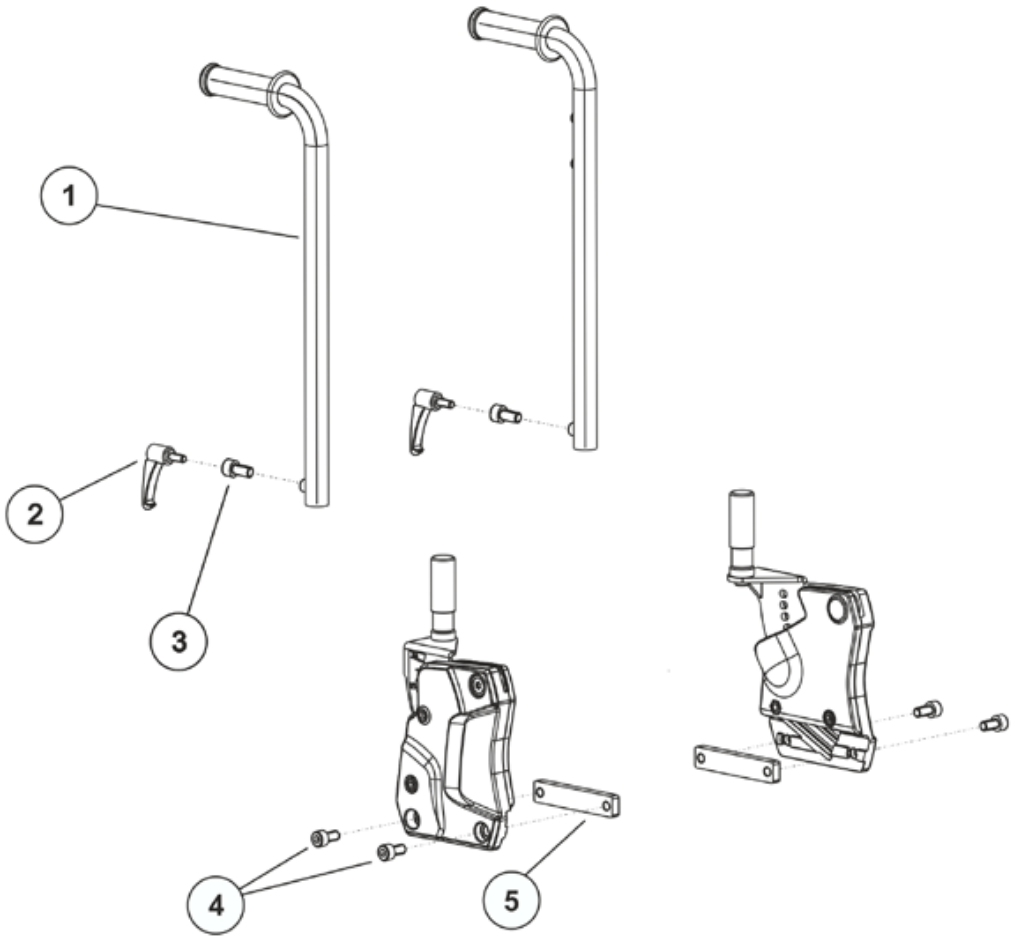
Requirements:
· 5 mm Allen key

Dismantling the backrest unit:

· Remove the backrest cushion.

· Loosen the fixation levers (2) of the corresponding backrest tube (1), depending on the version.
There are two versions:
(2) - for the manual backrest
(3) - for the electrically adjustable backrest

· Remove the backrest tube.



· Loosen and remove the two hexagon socket head screws (4) to the sliding block (5) on the left and right side of the chair.

Refitting the backrest unit:

· Replace the parts in the reverse order.

· To conclude, you should always carry out a trial run to test the vehicle functions.

8.17.4 Adjusting the backrest width

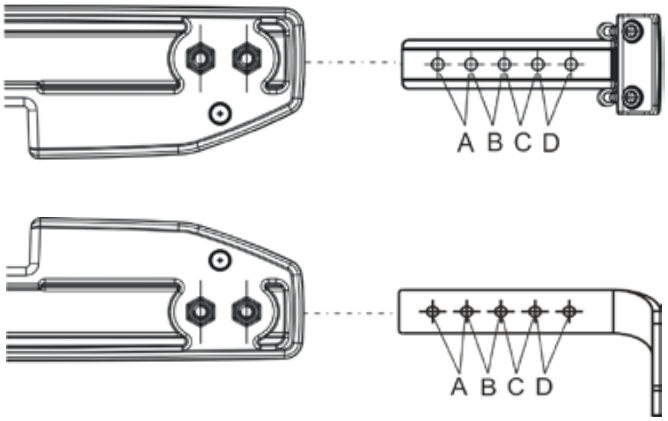
The backrest width is adjusted by performing the following tasks:

- Adjust the backrest tube.
- Adjust the backrest:
  - Sling backrest, as described in chapter 8.15.2.
  - Flex3 backrest, as described in chapter 8.17.6.
- Replace the backrest cushion (these are available in various widths).

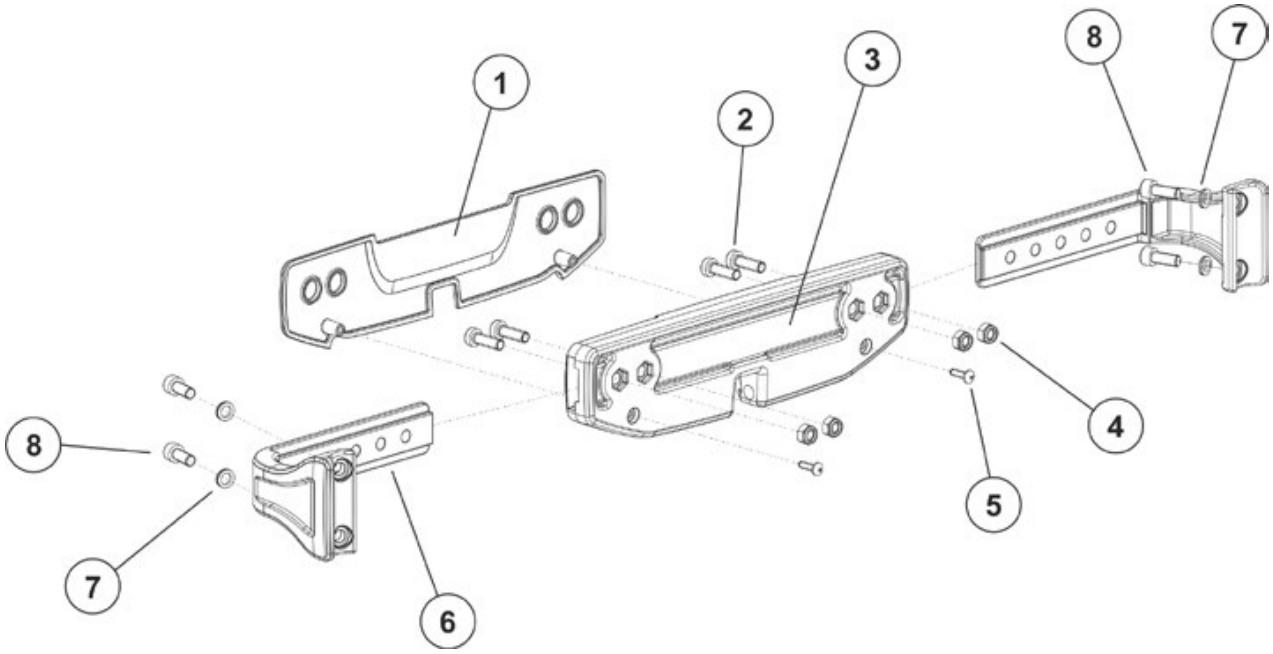
When modifying the backrest width, the seat width must also be correspondingly adapted. Please see chapter **10.3.3**.

Requirements:
- 3 mm Allen key
- 5 mm Allen key
- 13 mm Open-ended spanner

The screw position for the backrest width, refer to the table:



Screw position	Seat width
A	530 mm
B	480 mm
C	430 mm
D	380 mm

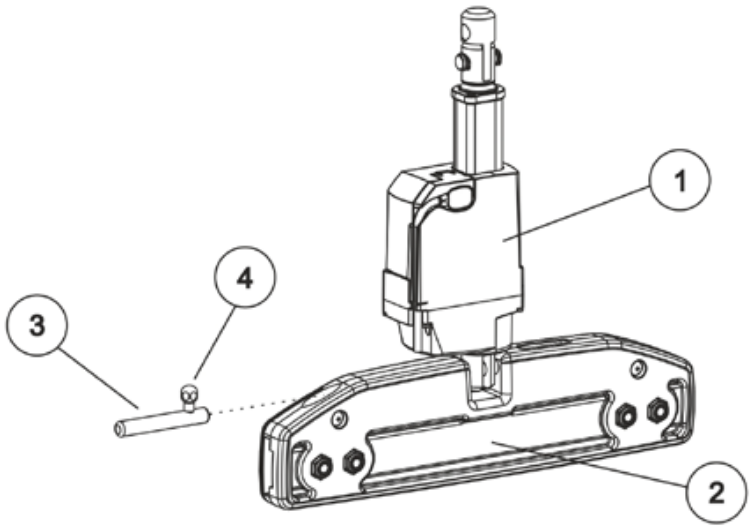


- Remove the backrest cushion.
- Loosen the straps of the sling backrest or remove the Flex3 backrest.
- Loosen and remove both screws (5) of the actuator fixation bracket.
- Remove the cover of the actuator fixation bracket.
- Loosen and remove the screws and nuts (2, 4) on the upper and lower actuator fixation bracket on both sides.
- Adjust the backrest fixation (6) for the new backrest width according to the table on page 157.
- Insert the screws (2) through the cover of the actuator fixation bracket and the corresponding holes of the backrest fixation to the actuator fixation.
- Fasten these with the nuts (4).
- Reposition the cover of the actuator fixation bracket.
- Insert and tighten the screws (5) again.
- Adjust the straps of the sling backrest to the new width or install the adjusted Flex 3 backrest.
- Install the backrest cushion.
- Perform a function check of the chair.

8.17.5 Replacing the backrest actuator

Dismantling the backrest actuator:

- Pull the cable off directly where it is connected to the actuator (1)
- Detach the bracket of the actuator at the top and bottom; to do this, slide the bolts (3) to the side using the lever (4) and tilt the actuator (1) out of the backrest clamp (2).
- Replace actuator.



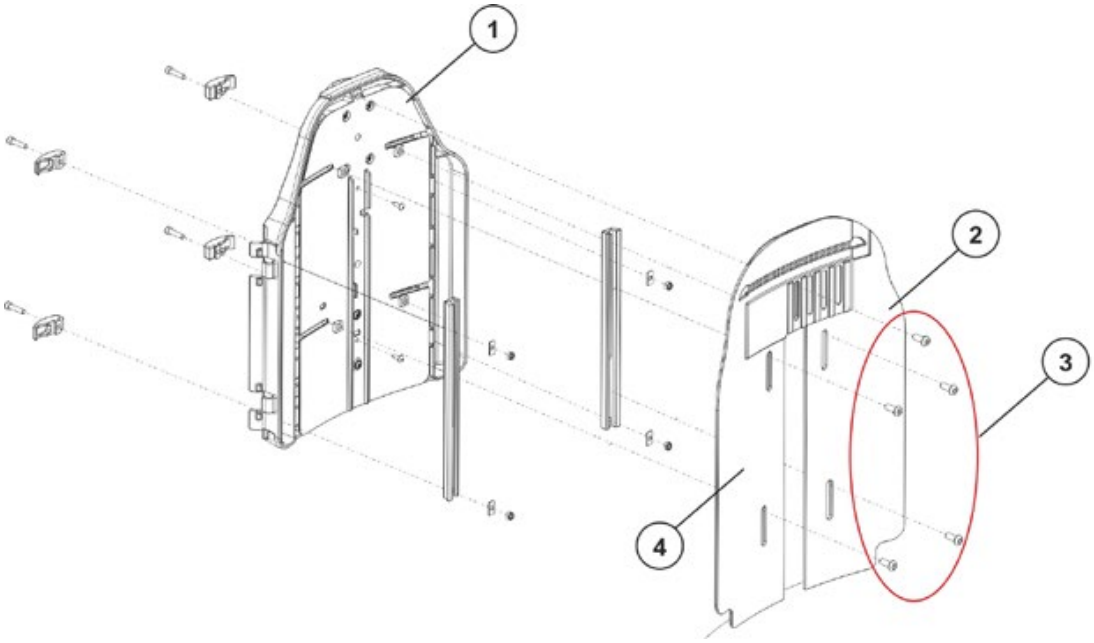
Refitting the backrest actuator:

- Assemble the parts in the reverse order.

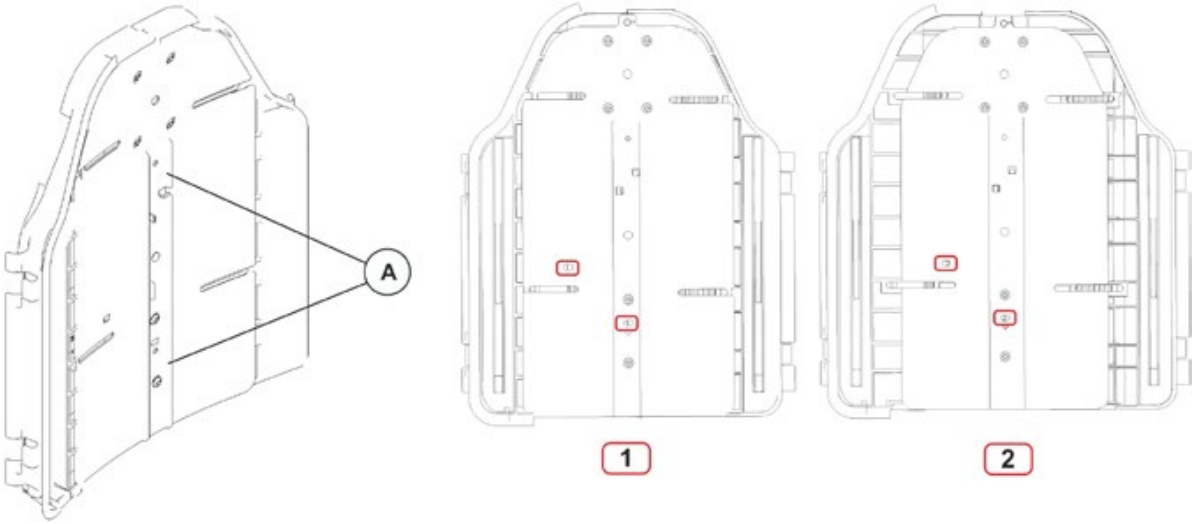
8.17.6 Adjusting the Flex3 backrest

Requirements:
- Phillips screwdriver
- 5 mm Allen key

- Remove the front lateral plates (2 and 4) from the backrest (1) by loosening and removing the five hexagon socket head screws (3).



- Remove both Phillips screws (A) on the middle plate.

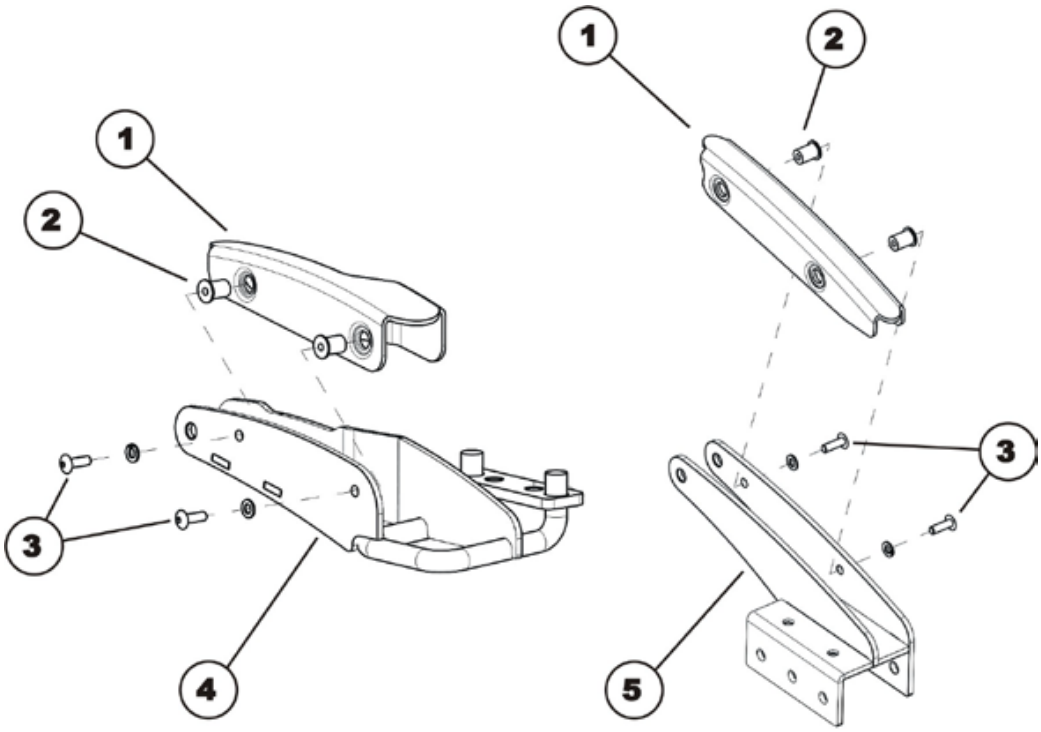


- Shift the position of the rear plate halves (three settings are possible using the drill holes).
  - **Before** pulling the Flex3 backrest apart, a "1" will be visible in the small, rectangular cut-out.
  - **After** pulling the Flex3 backrest apart, a "2" will be visible in the small, rectangular cut-out.
- Re-insert the two screws (A) into the middle plate.
- Fasten the front lateral plates (2 and 4) again.

8.18 Storm4 X-plore specific parts

8.18.1 Replacing X-plore trim on the swing arm

Requirements:
· 4 mm Allen key



Note
The procedure is identical for the front swing arm (4) and rear swing arm (5).

Removing the trim:

· Undo the two Allen screws (3) with a 4 mm Allen key.

· Remove the Allen screws (3) together with the washers.

· Press the trim (1) out of the swing arm (4) or (5) from below. When doing so, take care with the insert nuts (2).

Refitting the trim:

· Replace the parts in the reverse order.

8.18.2 Replacing the front X-plore swing arm

WARNING: Danger of crushing!

The mobility device is very heavy. Injury hazard to hands and feet!

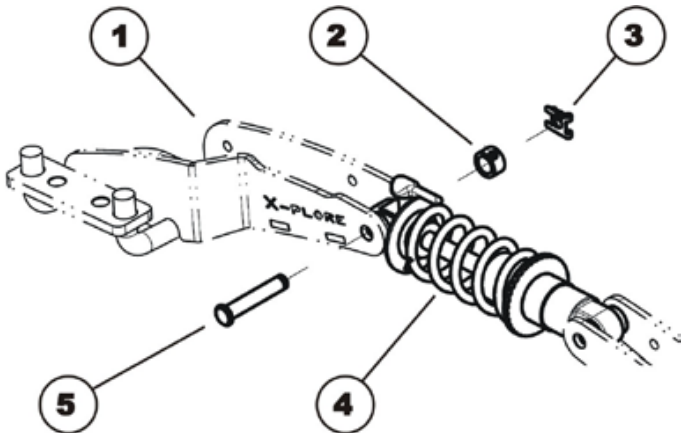
- *Use proper lifting techniques.*

Injury hazard caused by uncontrolled movement of the mobility device!

- *Switch the power supply off (ON/OFF key).*
- *Engage the drive.*
- *Before raising the vehicle, secure the wheels by blocking them with wedges.*

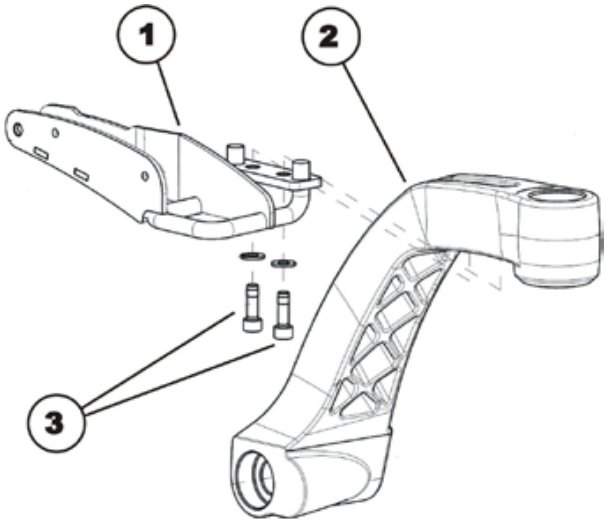
Requirements:

- 4 mm Allen key
- 6 mm Allen key
- Long wooden blocks, min. 14 x 14 x 30 cm



Dismantling the swing arm:

- Lift the mobility device onto several wooden blocks. Use proper lifting techniques
- Remove the securing clip (3).
- Remove the spacer (2).
- Carefully remove the bolts (5) which connect the shock absorber (4) to the swing arm (1).



- Undo the two Allen screws (3) with a 6 mm Allen key.
- Remove the Allen screws (3) together with the washers.
- Remove the swing arm (1) out of the front wheel link fork (2).
- Remove the trim as described in chapter 8.18.1 if necessary.

Refitting the swing arm:

- Replace the parts in the reverse order.
- To conclude, you should always carry out a trial run to test the vehicle functions.

8.18.3 Removing the rear X-plore swing arm

WARNING: Danger of crushing!

The mobility device is very heavy. Injury hazard to hands and feet!

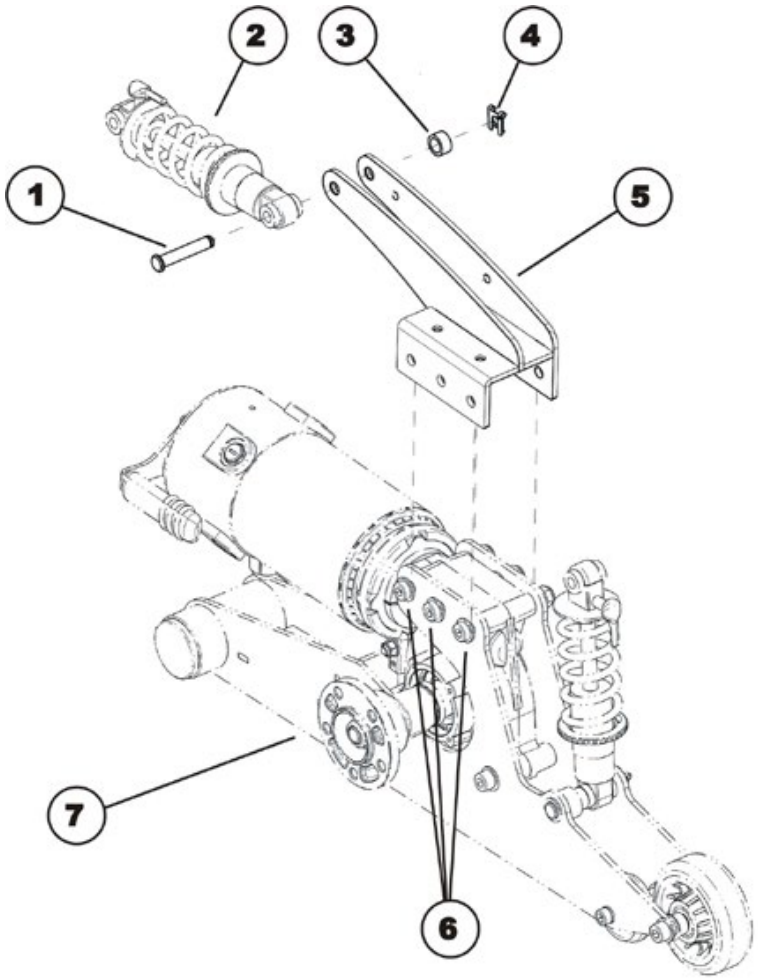
- *Use proper lifting techniques.*

Injury hazard caused by uncontrolled movement of the mobility device!

- *Switch the power supply off (ON/OFF key).*
- *Engage the drive.*
- *Before raising the vehicle, secure the wheels by blocking them with wedges.*

Requirements:

- 5 mm Allen key
- 6 mm Allen key
- open-ended spanner, 13 mm
- Long wooden blocks, min. 14 x 14 x 30 cm



Dismantling the swing arm:

- Remove the drive wheel as described in chapter 8.10.1.
- Remove the splash guard as described in chapter 8.1.6.

- Remove the securing clip (4).
- Remove the spacer (3).
- Carefully remove the bolts (1) which connect the shock absorber (2) to the swing arm (5).
- Loosen the three Allen screws (6) with a 6 mm Allen key and a 13 socket spanner.
- Remove the bolts (3) together with the washers.
- Pull the swing arm (5) out of the rear wheel link fork (7) and replace it.
- Remove the trim as described in chapter 8.18.1 if necessary.

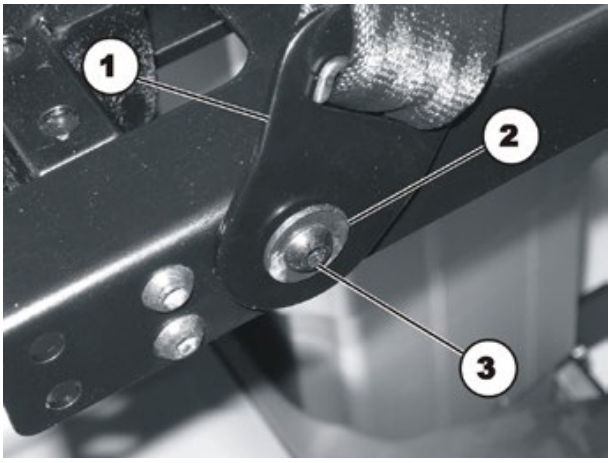
Refitting the swing arm:

- Replace the defective parts.
- Replace the parts in the reverse order.
- To conclude, you should always carry out a trial run to test the vehicle functions.

9 Installing accessories

9.1 Replacing the safety belt

Requirements:
- 10 mm socket spanner
- 4 mm Allen key



Dismantling the safety belt:

- Loosen the bolt (3) and the associated nut (in the figure this is covered) with a 4 mm Allen key and a 10 mm socket spanner.
- Remove the nut incl. the washer.
- Remove the screw incl. the safety belt, the washer (2) and the washer arranged behind.

Note
Another nut is fixed between the two washers (2) and (4) as a spacer so that the belt mounting can rotate freely.

- Replace the safety belt (1).

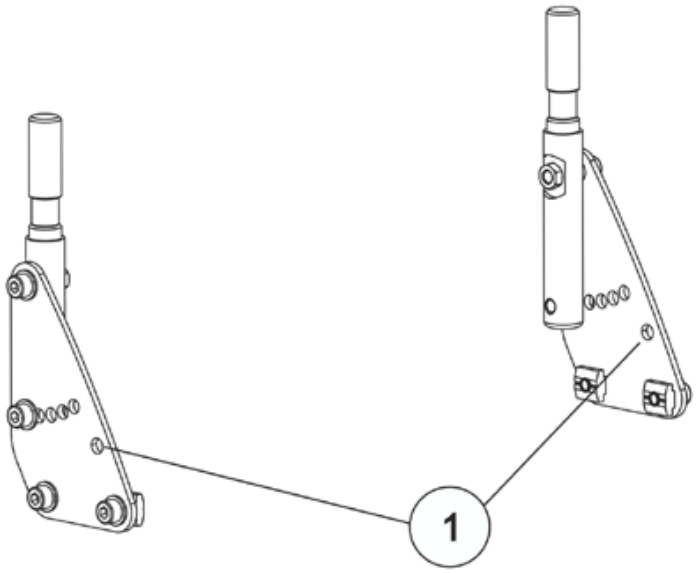
Refitting the safety belt:

- Refit the parts in reverse order.

9.2 Replacing seat belts (Modulite seat)

9.2.1 Installation on the backrest mounting bracket (simple backrest)

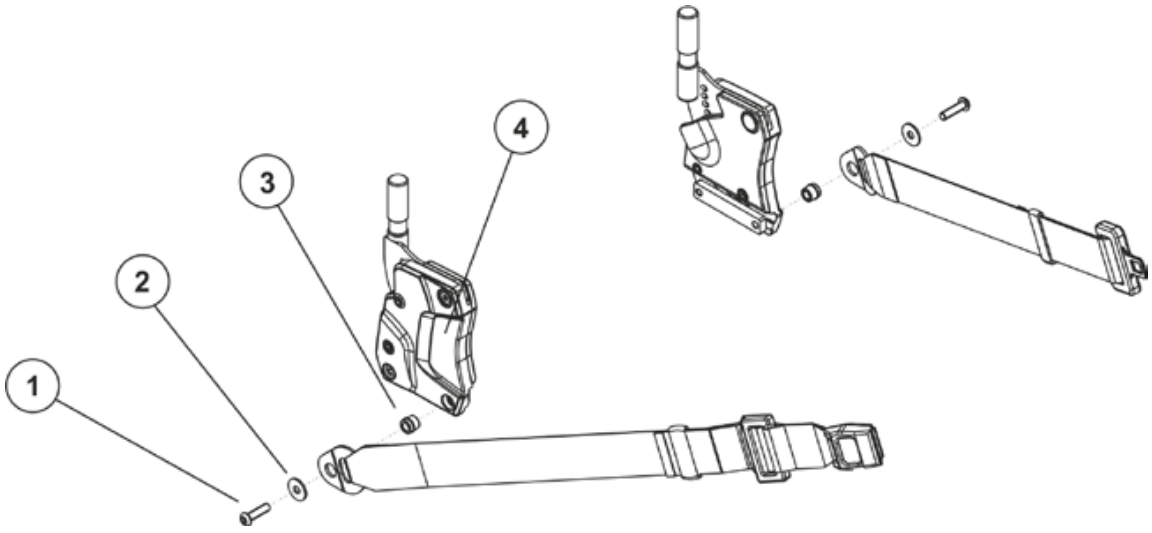
Requirements:
- 13 mm Socket spanner
- 5 mm Allen key



- The seat belts are attached via the drill hole (1) at the top right.
- The installation of seat belts is described in chapter 9.1.

9.2.2 Installation on the backrest mounting bracket (adjustable seat)

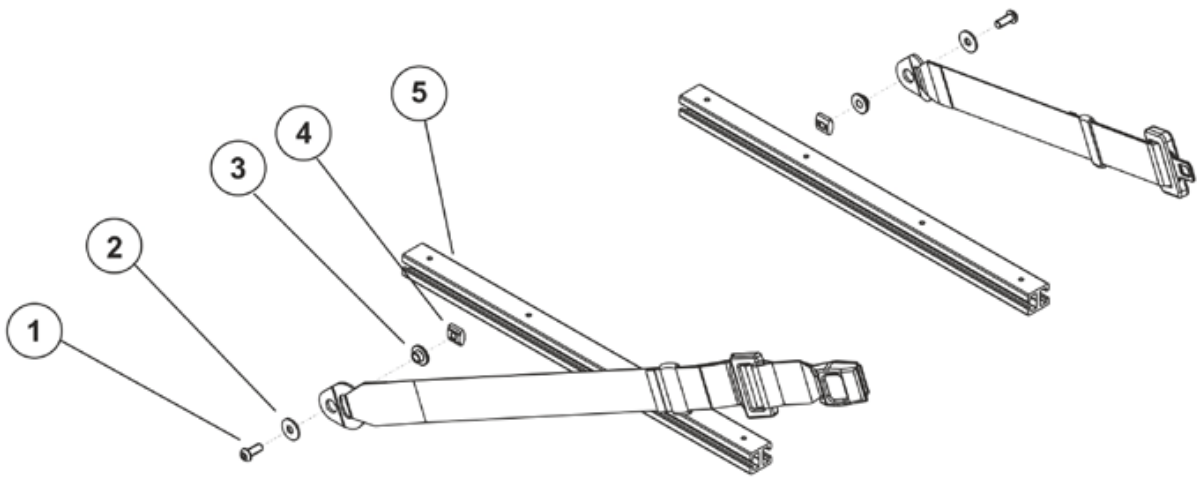
Requirements:
- 5 mm Allen key



- Loosen the screw (1) with a 5 mm Allen key.
- Remove the screw (1), the corresponding washer (2) and the seat belt and belt winder (3) from the backrest mounting bracket (4).
- Replace the safety belt.
- Refit the parts in the reverse order.

9.2.3 Installation on the seat frame profile (adjustable seat)

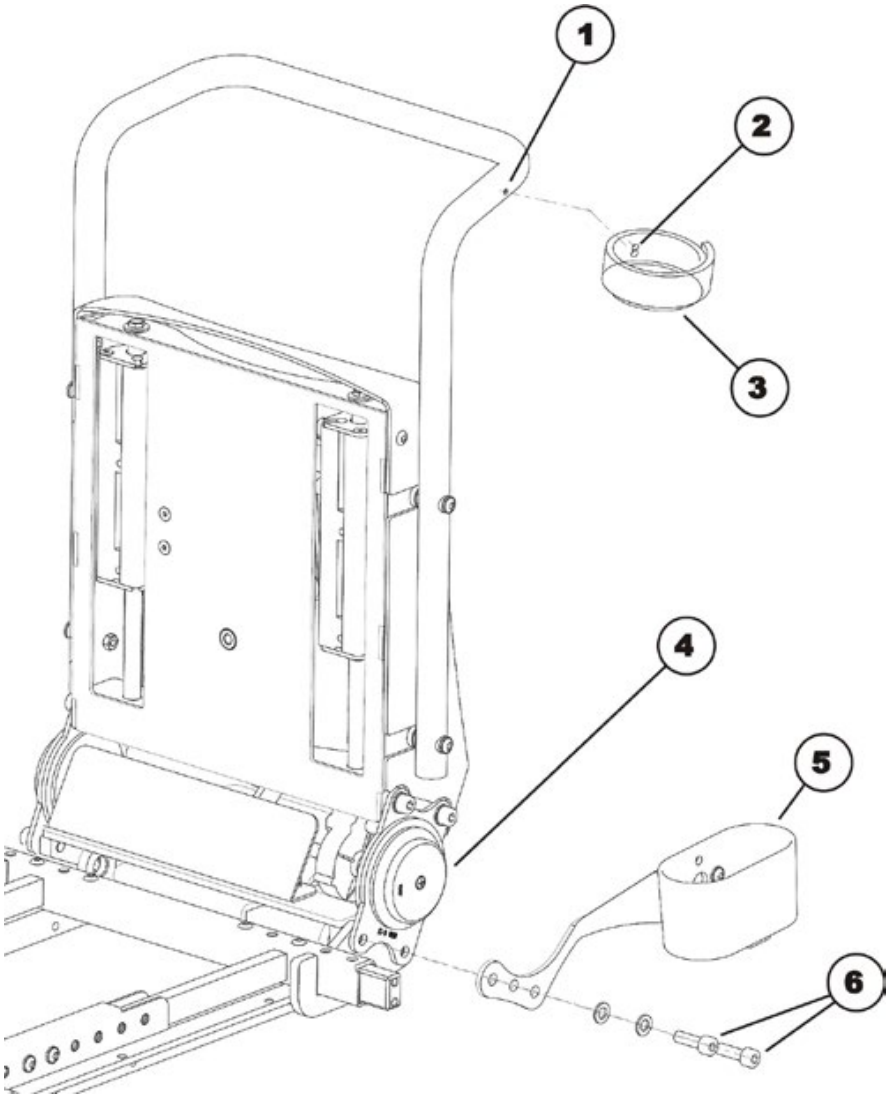
Requirements:
- 5 mm Allen key



- Loosen the screw (1) with a 5 mm Allen key.
- Remove the screw (1), the washer (2), the seat belt, the sliding bushing (3) and the sliding block (4) from the seat frame profile (5).
- Replace the safety belt.
- Refit the parts in the reverse order.

9.3 Fitting the stick holder

Requirements:
- 5 mm Allen key
- Phillips screwdriver size 2

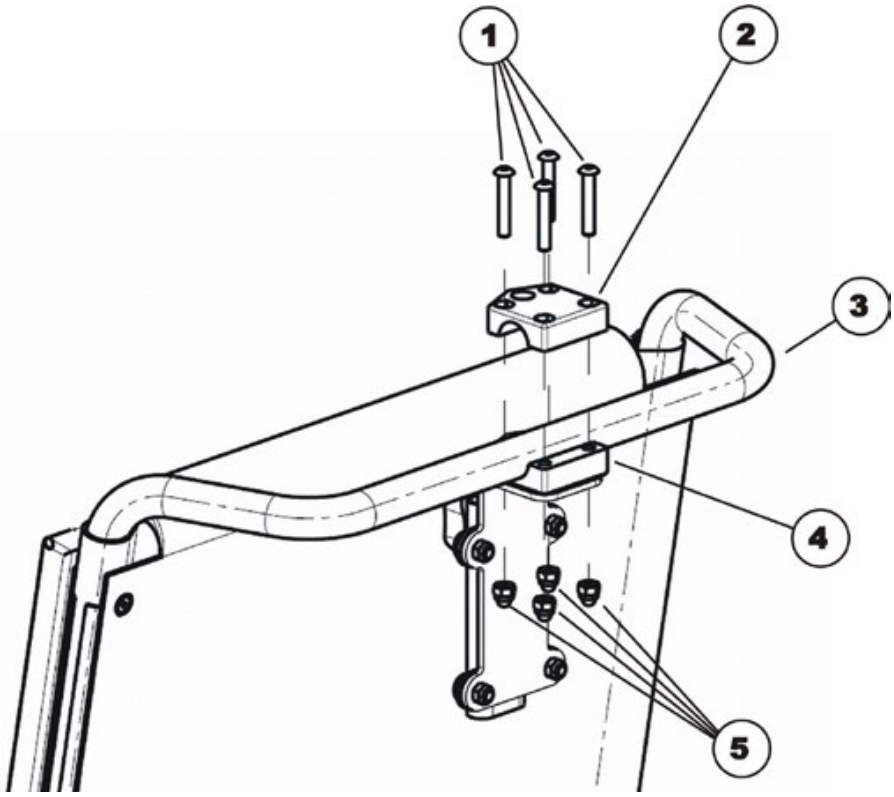


- Insert the Phillips screw (2) through the borehole of the loop (3).
- Attach the Phillips screw and the loop to the borehole (1) of the handlebar and tighten the Phillips screw with a Phillips screwdriver.
- Loosen and remove the two Allen screws (6) incl. the washers on the lower part of the backrest hinge (4).
- Hold the lower mounting (5) with the fastening holes in front of the boreholes of the backrest hinge.
- Refit the two Allen screws (6) incl. the washers and tighten the screws.

9.4 Fitting the headrest

9.4.1 Fitting the headrest to the standard back

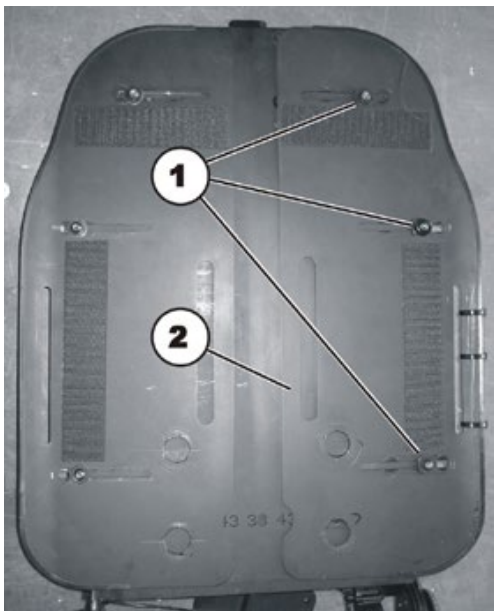
Requirements:
- 5 mm Allen key
- 10 mm socket spanner



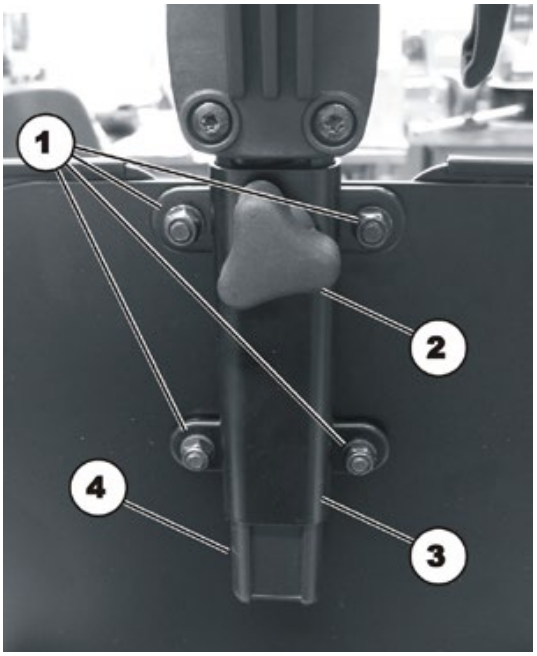
- Gripping it at the base, hold the lower section of the headrest mounting (4) with the clamp block against the handlebar (3).
- Attach the clamp cover (2.
- Insert the four Allen screws (1) from above through the boreholes.
- Fit the four cap nuts (5) to the screws from underneath.
- Use a 5 mm Allen key and a 10 mm socket spanner to tighten the screws and the cap nuts.
- Fit the headrest in the guide bar.

9.4.2 Fitting the headrest to the EasyAdapt back

Requirements:
- 4 mm Allen key
- T30 torx wrench
- 10 mm socket spanner



- Loosen the three Allen screws (1) using a 4 mm Allen key, but do not remove the screws completely.
- Move the back plate (2) outwards.
- Repeat this on the second back plate.



- Insert the torx screws from the front through boreholes made in the top of the backrest.
- Attach the washers to the torx screws from the rear.
- Fit the headrest holder (3) onto the torx screws.
- Attach further washers to the torx screws.
- Fit the nuts (1) to the torx screws.
- Tighten the torx screws and the nuts using a T30 torx wrench and a 10 mm socket spanner.
- Insert the headrest (4) in the headrest holder.
- Fit the thumb screw (2) and tighten it.
- Move the back plates back to the old width.
- Tighten the three Allen screws on the back plates.

9.5 DAHL Docking Station

CAUTION: Danger of crushing!

The mobility device is very heavy. Injury hazard to hands and feet!

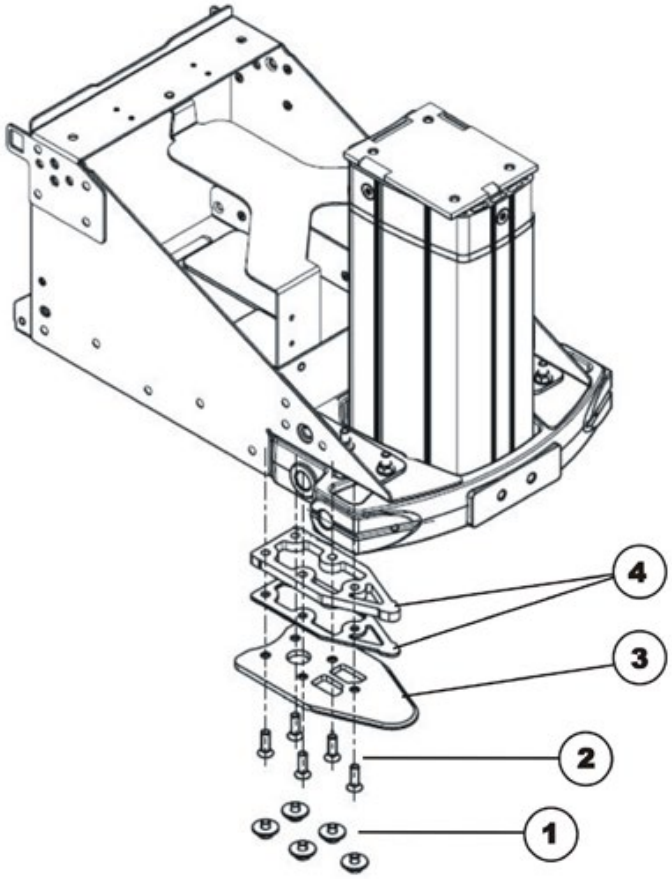
- *Use proper lifting techniques.*

Injury hazard caused by uncontrolled movement of the mobility device!

- *Switch the power supply off (ON/OFF key).*
- *Engage the drive.*
- *Save the vehicle laid on its side against overturning.*

Requirements:

- 6 mm Allen key
- high-strength screw blocker system, e.g. Loctite 270

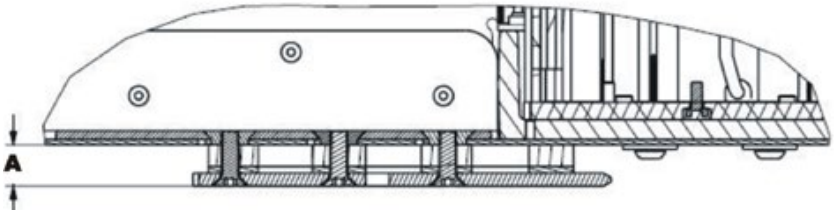


Note

Depending on the vehicle, several spacers (4) may be required additionally to the safety plate (3). Please refer to the documentation provided by DAHL (see also www.dahlengineering.dk) for information on whether and how many spacers are required.

Note
The countersunk screw (2) material quality must be at least 8.8.
If spacers have been fitted, the screws length should be completed as follows:
A = thickness of safety plate and spacers

Screw length = A + 6mm



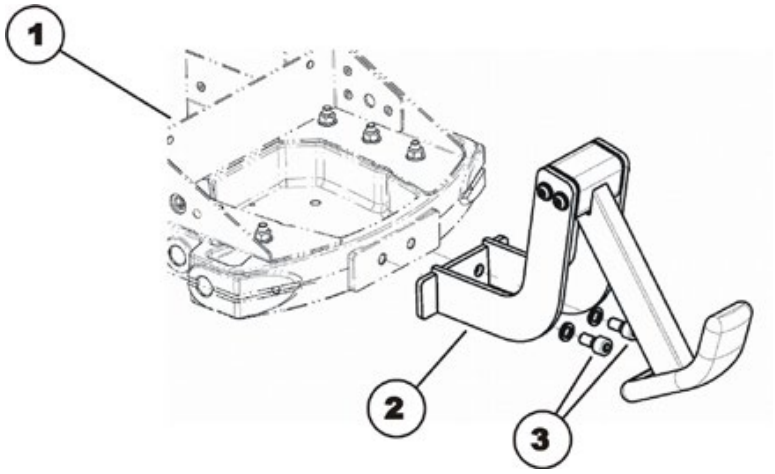
Fitting the DAHL Docking Station:

- Lay the mobility device on its side and secure it against tipping over. Use proper lifting techniques.
- Undo and remove the five bolts (1) including the washers on the underside of the chassis.
- Calculate the required screw length in accordance with the above formula.
- Select five M8 Allen key countersunk screws in accordance with DIN 7991 to suit the calculated length.
- Fit the spacers (4) and the safety plate (3) over the drillholes.
- Fit the Allen screws (2) with a high-strength screw blocker system such as Loctite 270.
- Fit the remaining parts in the reverse order.

9.6 Curb climber

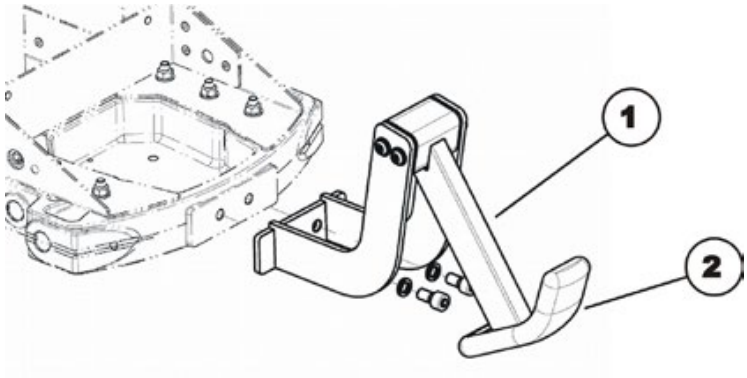
9.6.1 Fitting the curb climber

Requirements:
- 8 mm Allen key



- Dismantle the legrests.
- Arrange the curb climber mounting (7) on the front side of the chassis (1).
- Fit the two Allen screws (6) incl. the washers and tighten the screws with an 8 mm Allen key.
- Refit the legrests.

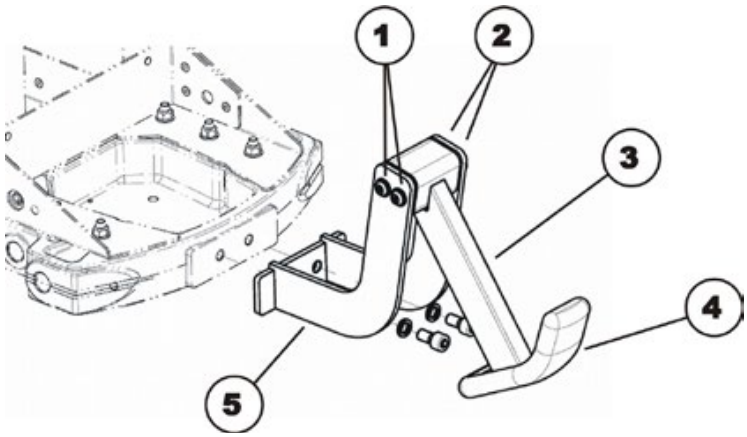
9.6.2 Replacing the positioning shoe



- Dismantle the legrests.
- Pull the positioning shoe (2) off the curb climber (1) in a forward direction.
- Slide a new positioning shoe onto the curb climber.
- Refit the legrests.

9.6.3 Replacing the curb climber

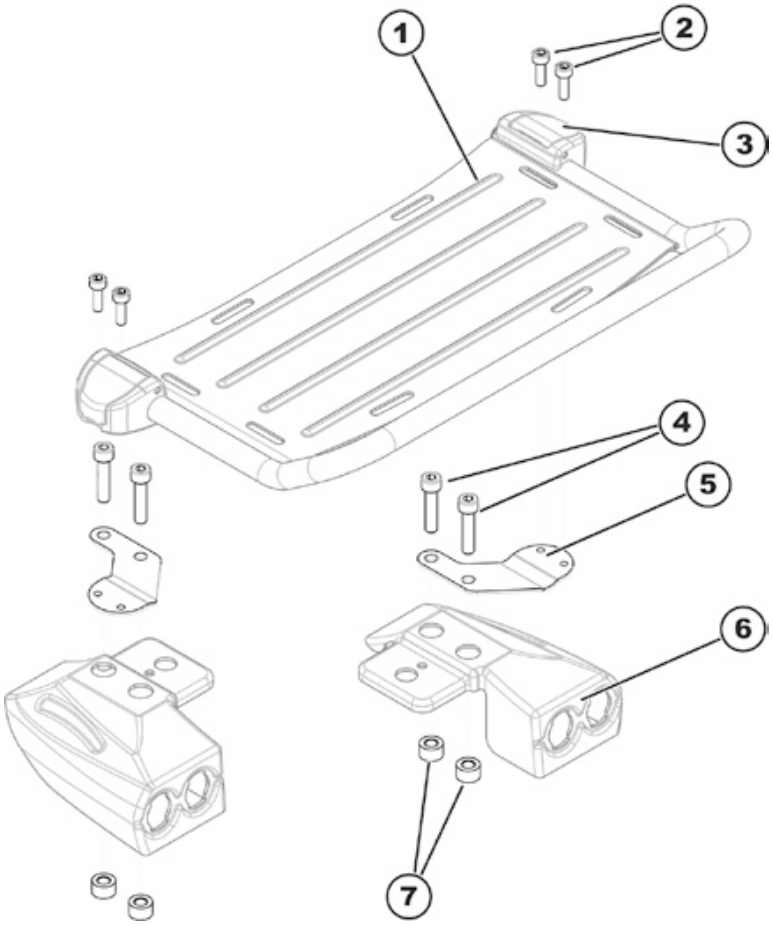
Requirements:
- 5 mm Allen key
- 13 mm socket spanner



- Dismantle the legrests.
- Insert the curb climber (3) in the mounting (5).
- Fit the two Allen screws (1) with two washers.
- Fit two nuts (2) with washers from the other side.
- Tighten the Allen screws and nuts using a 5 mm Allen key and a 13 mm socket spanner.
- If necessary, fit the positioning shoe (4) to the curb climber as described in chapter 9.6.2.
- Refit the legrests.

9.7 Luggage carrier

Requirements:
- 5 mm Allen wrench
- 10 mm open-ended wrench



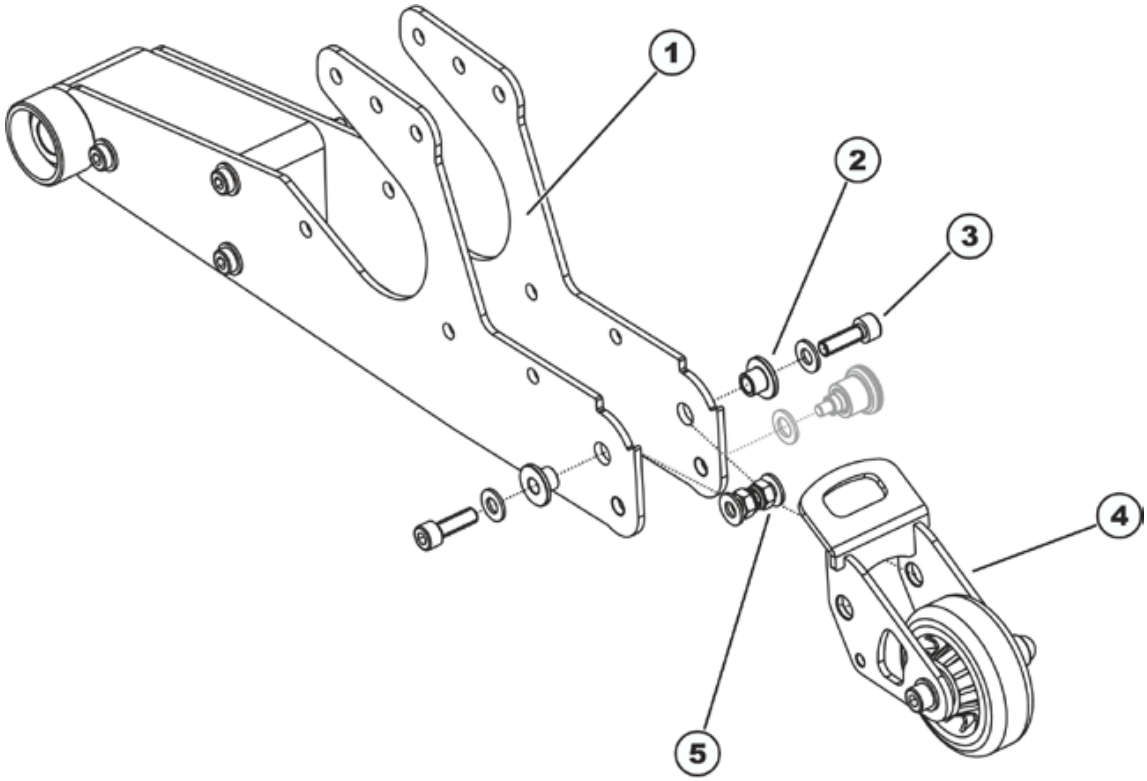
- Check whether there are drill holes for the screws (4) on the covers of the spring supports (6).
- If no drill holes are present:
  - Loosen and remove both of the covers of the spring supports (6), as described in chapter 8.1.4
  - Drill holes in the covers, or replace the covers with covers which have pre-drilled holes, available as spare parts.
- Insert the spacer rings (7).
- Install the fixation bracket (5).
- Open the clamping levers (3) of the luggage carrier fixation bracket.
- Push the brackets onto the luggage carrier (1).
- Install the luggage carrier with the brackets. When tightening the screws, make sure that the luggage carrier is correctly centered.

- Close both of the clamping levers.
- Make sure that the luggage carrier does not collide with the backrest or seat when adjusting the backrest angle or seat tilt to any setting.
- If collisions can occur:
  - Open the clamping levers of the luggage carrier fixation bracket.
  - Push the luggage carrier slightly towards the rear.
  - Close the clamping levers of the luggage carrier fixation bracket.

9.8 Anti-tippers

9.8.1 Installing anti-tippers

Requirements:
- 6 mm Allen wrench
- 13 mm open-ended wrench

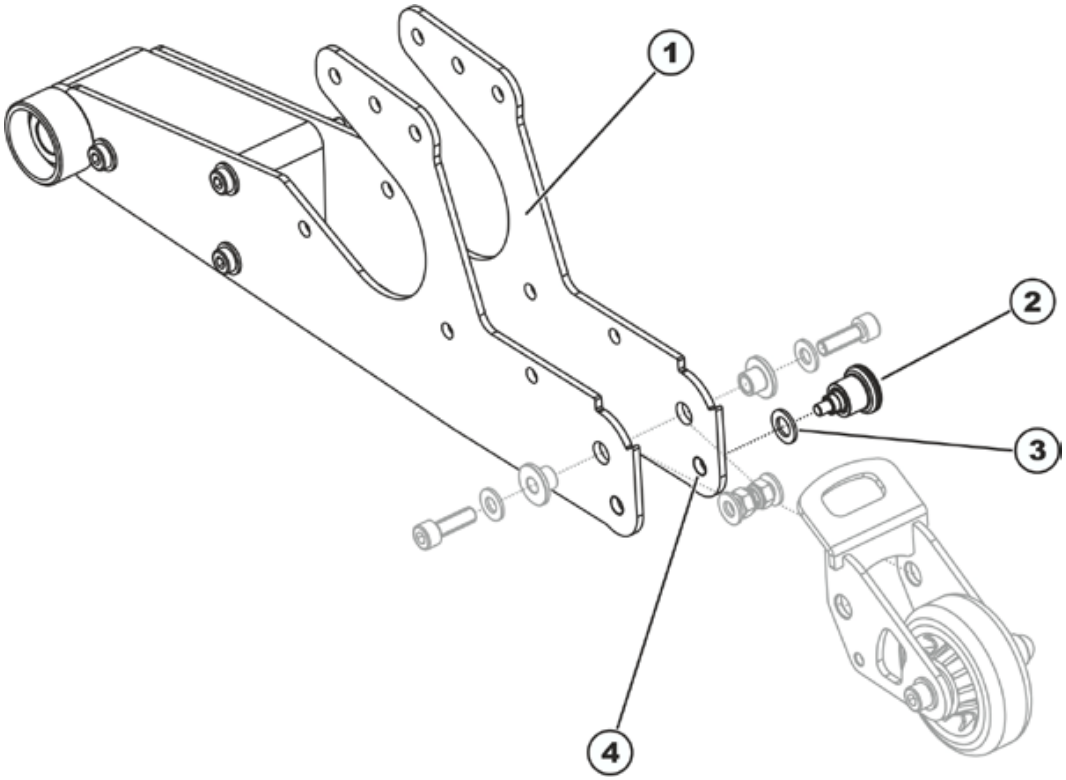


- Insert the slide bushing (2) into the motor rocker (1).
- Insert the anti-tipper (4) into the motor rocker from behind.
- Install the hexagon socket head screws (3) together with the washers.
- Secure the hexagon socket head screws with the self-locking nuts (5) including the washers from the inside.
- Install the locking pin, as described in chapter 9.8.2.

9.8.2 Installing the locking pin

Requirements:
- 12 mm open-ended wrench
- Medium strength thread locking adhesive, for example Loctite 243

Note
Always install the locking in on the inside of the motor rocker. This way the risk of damage is reduced.



- Apply medium strength thread-locking adhesive to the thread of the locking pin.
- Screw the locking pin, together with the washer (3) into the threaded hole (4) on the inner side of the motor rocker (1).
- Pull the head of the locking pin towards the rear and hold it in this position.
- Tighten the locking pin using an open-end wrench.

9.9 Further accessories

Note
The installation instructions for additional accessories are available at your Invacare® specialist supplier or directly from Invacare®.

10 Adjusting the seating position

In order to adapt the mobility device optimally to the requirements of the user, we recommend that you ask your authorised Invacare® the dealer toadjust the seat depth individually.

Adapting the seat to the user's seating position depends on which seat has been fitted, and should be carried out in the following sequence.

1. Adjusting the seat height, see chapter 10.1.
2. Adjusting the lower leg length, see chapter 10.2.
3. Adjusting the seat width and seat depth, see chapter 10.3.
4. Adjusting the center of gravity of the seat frame, see chapter 10.4
5. Adjusting the seat tilt, see chapter 10.5.
6. Checking that the swivel castors can move freely.
7. Repetition of steps 2 to 6, if necessary

WARNING!

Danger of injury hazard after tilting of mobility caused by blocked steering wheels.

- *Always check the seat depth settings for both forward and reverse movement.Make sure that steering wheels can rotate freely and have not contact to any fixed mobility device component.*

CAUTION: Danger of tipping over!

Any change in the seating position can negatively influence the stability of the electric wheelchair.

- *Always make sure that the wheelchair is stable and will not tip over, after adjusting the seating position.*

WARNING!

Any changes to the drive program can affect the driving characteristics and the tipping stability of the vehicle!

- *Changes to the drive program may only be carried out by trained Invacare® specialist dealers!*
- *Invacare® supplies all mobility devices with a standard drive program ex-works. Invacare® can only give a warranty for safe vehicle driving behaviour - especially the tipping stability - for this standard drive program!*

WARNING: Danger of crushing!

The seat is very heavy. Danger of injury to hands and feet.

- *Pay attention to the hand and feet*
- *Use proper lifting techniques*

10.1 Adjusting the seat height

The seat height is adjusted via the seat column.

An overview of the different types of seat columns is shown in chapter 8.14.2.

10.1.1 Adjusting the seat height with a seat column installed

WARNING: Danger of crushing!

The seat is very heavy. Injury hazard to hands and feet!

- *Use proper lifting techniques.*

WARNING: Danger of crushing!

Injury hazard caused by uncontrolled movement of the mobility device!

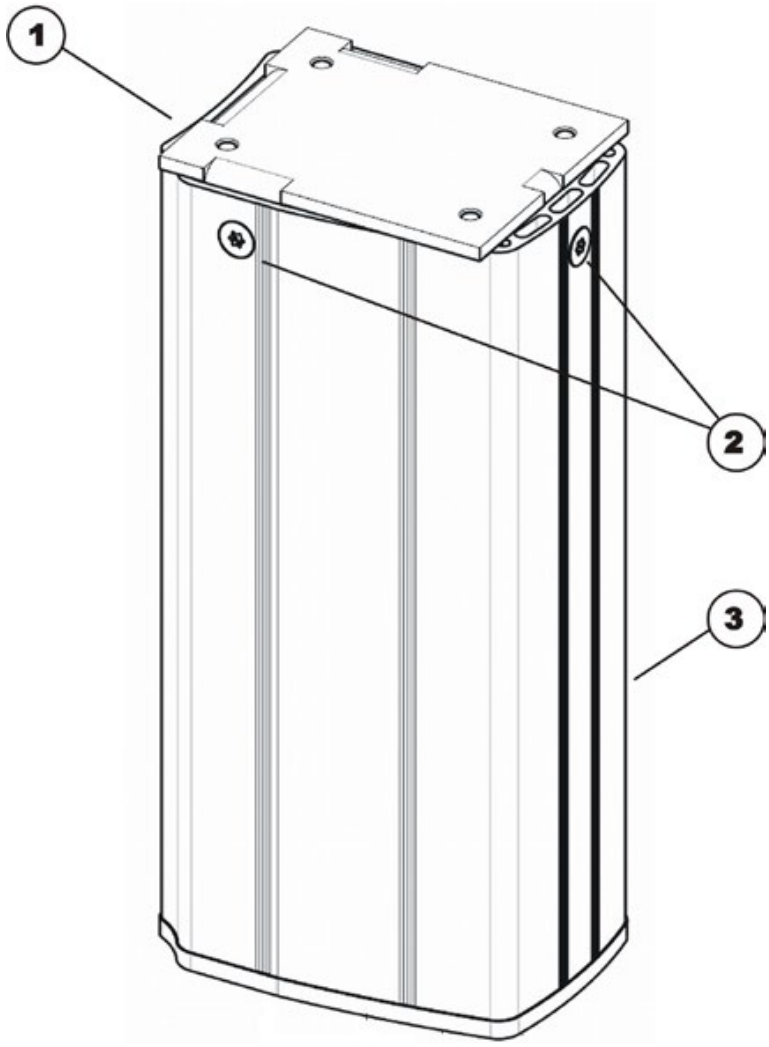
- *Switch the power supply off (ON/OFF key).*
- *Engage the drive.*

Requirements:

- 4 mm Allen key
- T40 torx wrench
- Oblique pliers
- Cable ties

Manual seat height adjustment

- Remove the seat as described in chapter 8.14.1.1 or 8.14.1.3.

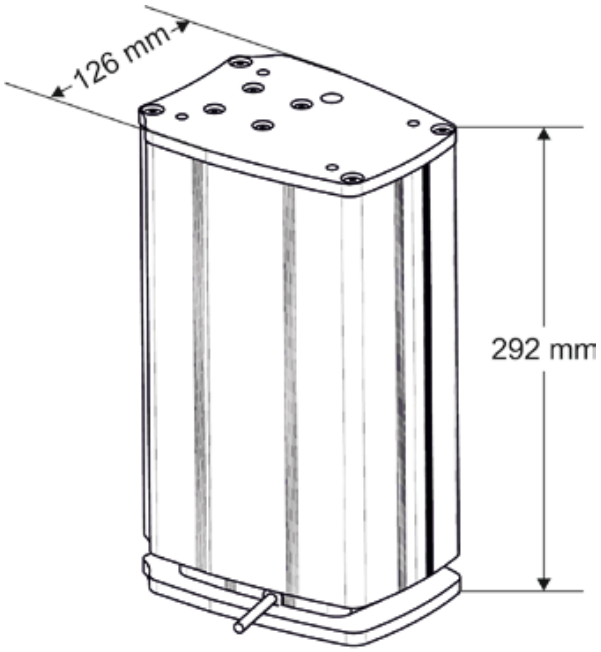


- Loosen and remove the four Torx screws (2) on the upper side of the column (3).
- Lift off the coverplate (1).

Note
The cover plate has four flaps pointing downward. There are two tapped holes on each flap for the screws (2). By selecting the upper or lower holes, the seat can be adjusted to two different heights.

- Attach the cover plate (1).
- Install the screws (2) in such a way that the cover plate is flush fitted or is somewhat elevated depending on the desired seat height.
- Refit the other parts in reverse order.
- To conclude, check all the mobility aid functions.

10.1.2 Adjusting the seat height on a type A electrical lifter column with an adapter



WARNING: Danger of crushing!

The seat is very heavy. Injury hazard to hands and feet!

· *Use proper lifting techniques.*

WARNING: Danger of crushing!

Injury hazard caused by uncontrolled movement of the mobility device!

· *Switch the power supply off (ON/OFF key).*

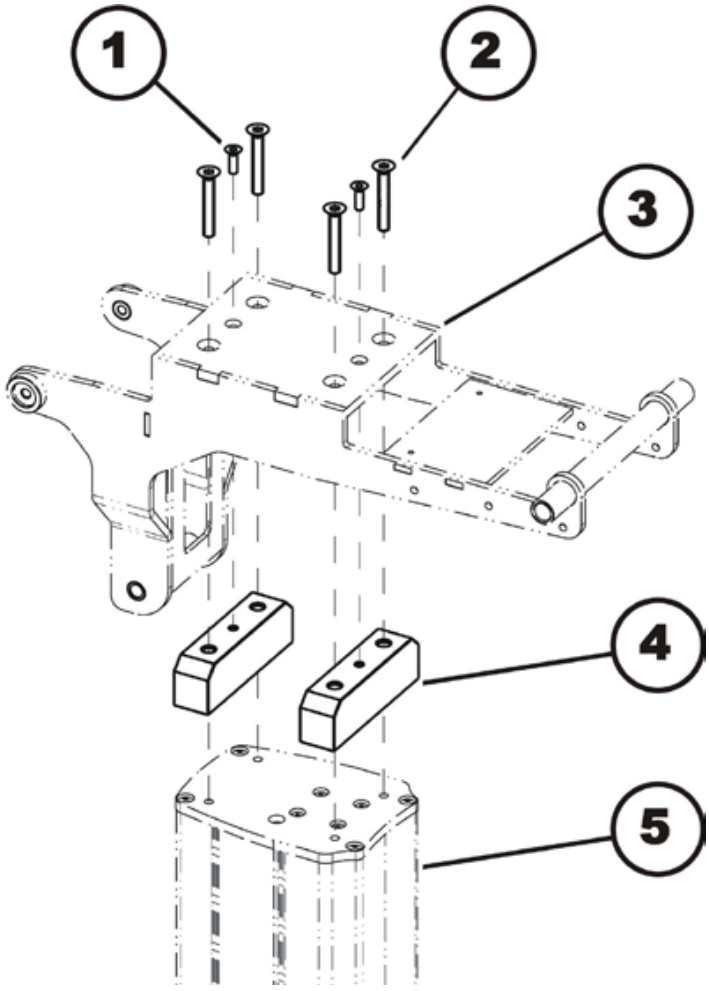
· *Engage the drive.*

Requirements:

· 4 mm Allen key
· 5 mm Allen key
· T40 torx wrench
· Oblique pliers
· Cable ties
· Torque wrench 5 – 30 Nm (or similar)
· Medium-strength thread-locking fluid, e.g. Loctite 243

Adjusting the seat height manually with an adapter:

· Remove the seat as described in chapter 8.14.1.1 or 8.14.1.3.



- Place the adapter (4) in the seat support (3) from below.
- Fix the adapter with the two Allen screws (1).
- Replace the seat support on the lifter pillar (5).

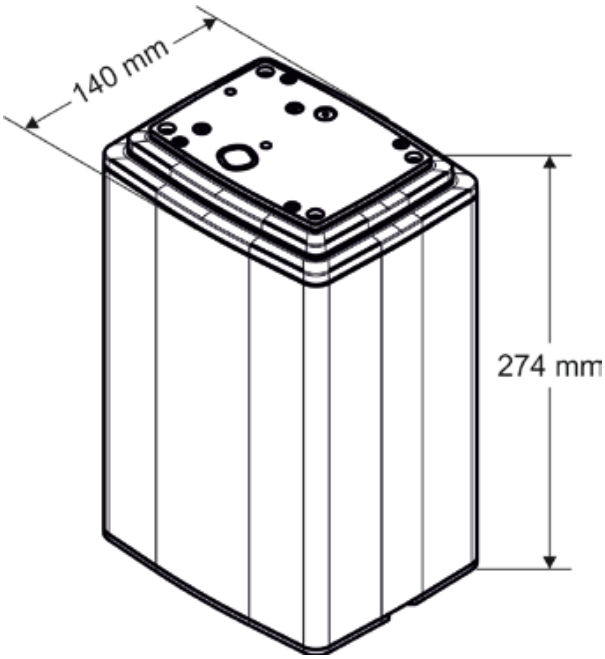
CAUTION!

Damage hazard to lifter pillar! Lifter pillar can be damaged if screws are too long. The screws used may protrude by a maximum of 8.5 mm from the adapters.

- *Only use the screws supplied*.
- *Check the screw length precisely if you do use other screws.*

- Apply a medium-strength screw blocker system to the four Allen screws (2).
- Insert the four Allen screws (2) and tighten them to a torque of 25 Nm.
- Refit the other parts in reverse order.
- To conclude, check all the mobility aid functions.

10.1.3 Adjusting the seat height on a type B electrical lifter column with an adapter



WARNING: Danger of crushing!

The seat is very heavy. Injury hazard to hands and feet!

- *Use proper lifting techniques.*

WARNING: Danger of crushing!

Injury hazard caused by uncontrolled movement of the mobility device!

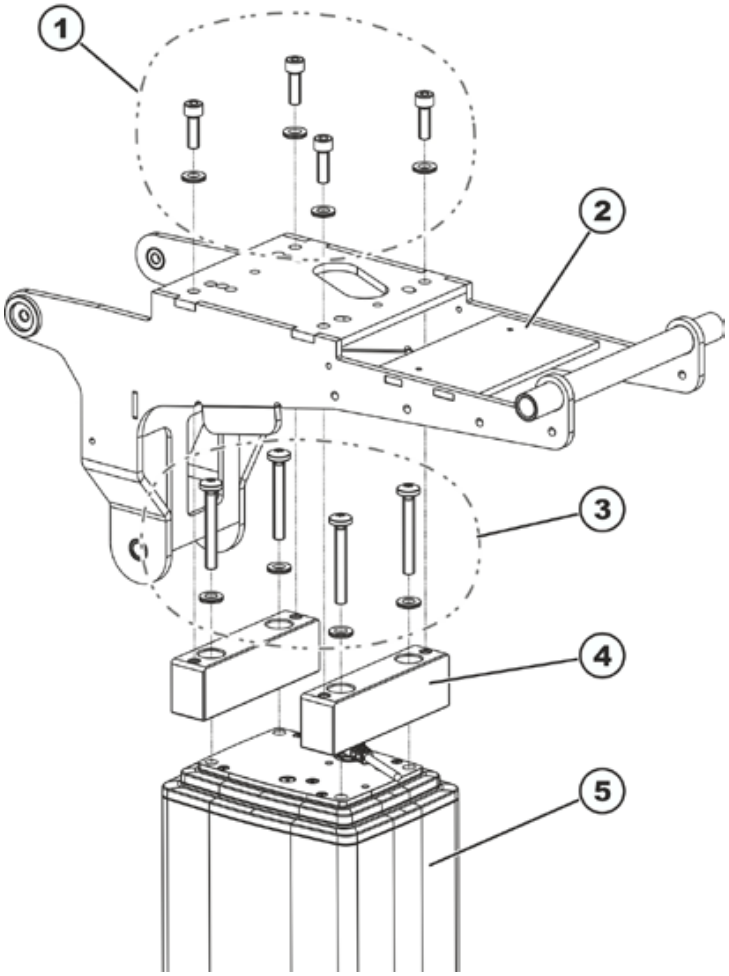
- *Switch the power supply off (ON/OFF key).*
- *Engage the drive.*

Requirements:

- 4 mm Allen key
- 5 mm Allen key
- T40 torx wrench
- Oblique pliers
- Cable ties
- Torque wrench 5 – 30 Nm (or similar)
- Medium-strength thread-locking fluid, e.g. Loctite 243

Adjusting the seat height manually with an adapter:

- Remove the seat as described in chapter 8.14.1.1 or 8.14.1.3.



CAUTION!

Damage to the lifter column possible! Using incorrect screws or inserting and tightening the screws incorrectly will damage the lifter column.

The lifter column is supplied with self-tapping screws. The screws are used on the underside as well as on the upper side.

- *Use only the screws provided.*
- *If the screws were already screwed in: When reinstalling the screws, make sure that they are screwed carefully into the existing thread.*
- *Tighten the screws to a torque of 15-17 Nm.*

- Position the adapter (4) on the top of the lifter column (5).
- Secure the adapter with the self-tapping screws and the washers (3).
- Position the seat frame (2) on the lifter column and adapter.
- Apply medium strength thread locking adhesive to the four hexagon socket head screws (1).
- Insert the four hexagon socket head screws and tighten them to a torque of 25 Nm.
- Refit the other parts in reverse order.
- Install the cables as described in chapter 8.6.2.
- To conclude, check all the mobility aid functions.

10.2 Adjusting the lower leg length

Invacare® offers a range of legrests which can be adjusted individually.

See operation manual.

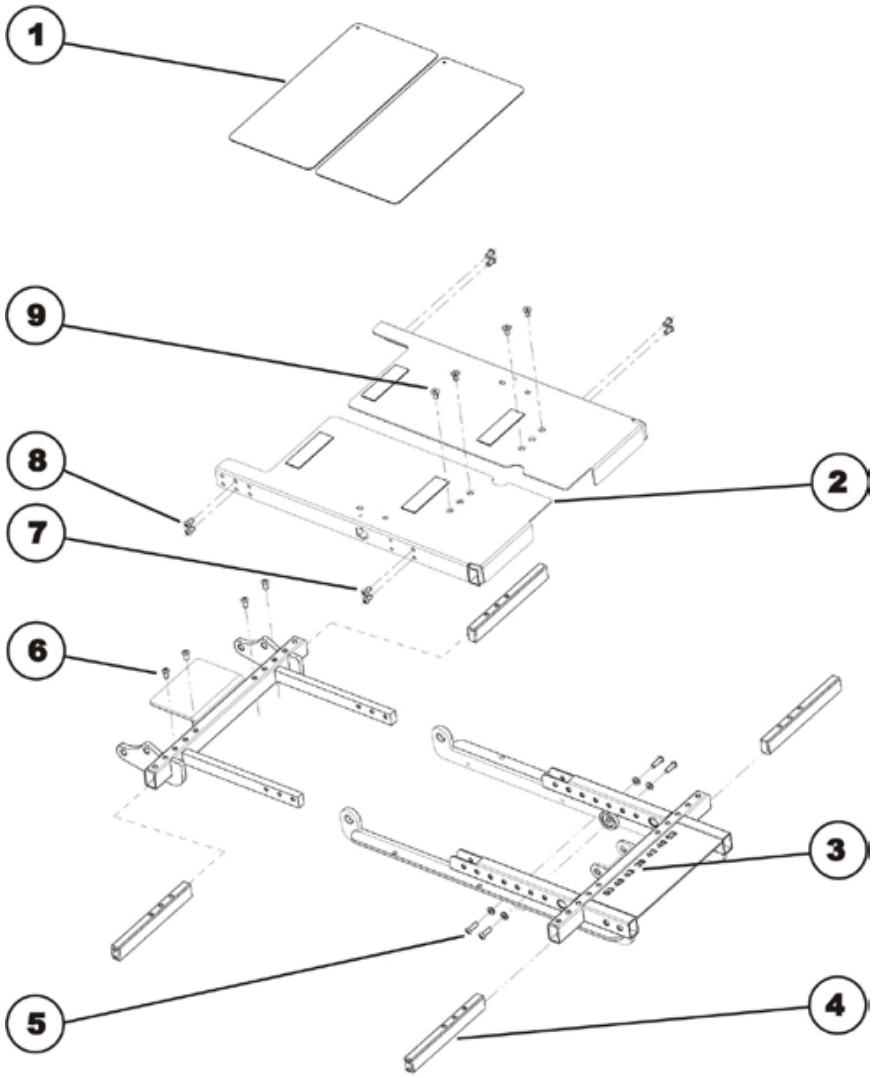
10.3 Seat support

10.3.1 Adjusting the seat width (standard seat)

Note
The seat width can be adjusted in stages between 38 and 53 cm.
Please also observe the following chapter 10.3.1 on “adjusting the seat depth”.

Note
Depending on the width and depth of the seat, the splash guards must also be replaced. Please also observe chapter 8.1.6 on “replacing the splash guard”.

Requirements:
· 4 mm Allen key



· Remove the seat cushion.
· Remove the cover plates (1).
· Release the two Allen screws (6) on the crossbar at the rear and remove them.

- Release the two upper front Allen screws (9) on the seat mounting plate and remove them.
- Loosen the four Allen screws at the front (7) and at the rear (8) that can be found on the side of the seat mounting plate in order to release tension and facilitate moving the plates. Do not remove these screws entirely.
- Pull or push the seat mounting plate (2) to the desired width. A scale (3) is included on the lower part of the seat support. You can read off the seat width in centimetres on the scale.
- Repeat these work steps on the other side of the seat.
- Now tighten all the screws again.

10.3.2 Adjusting the seat depth (standard seat)

Note
The seat depth can be adjusted in stages between 38 and 53 cm.
Please also observe preceding chapter 10.3.2 on “adjusting the seat width”.

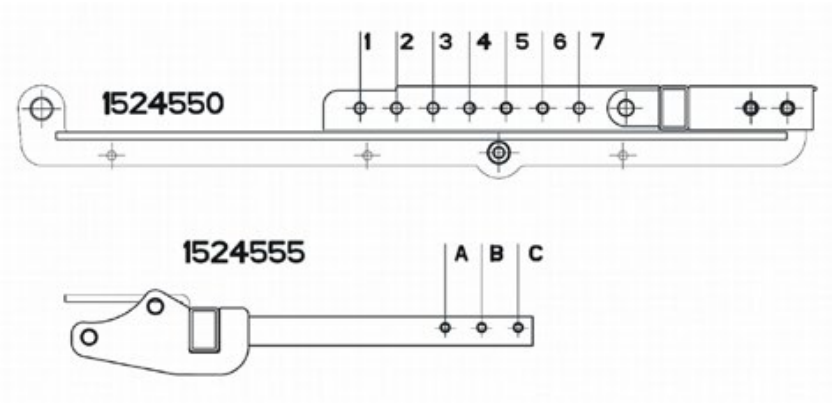
Note
Depending on the width and depth of the seat, the splash guards must also be replaced. Please also observe chapter 8.1.6 on “replacing the splash guard”.

Requirements:
- 4 mm Allen key
- 8 mm jaw spanner
- Oblique pliers
- Cable ties

Note
Certain holes in the seat support must be used for the screws depending on the desired seat depth. It may possibly be necessary to replace the seat support plates.

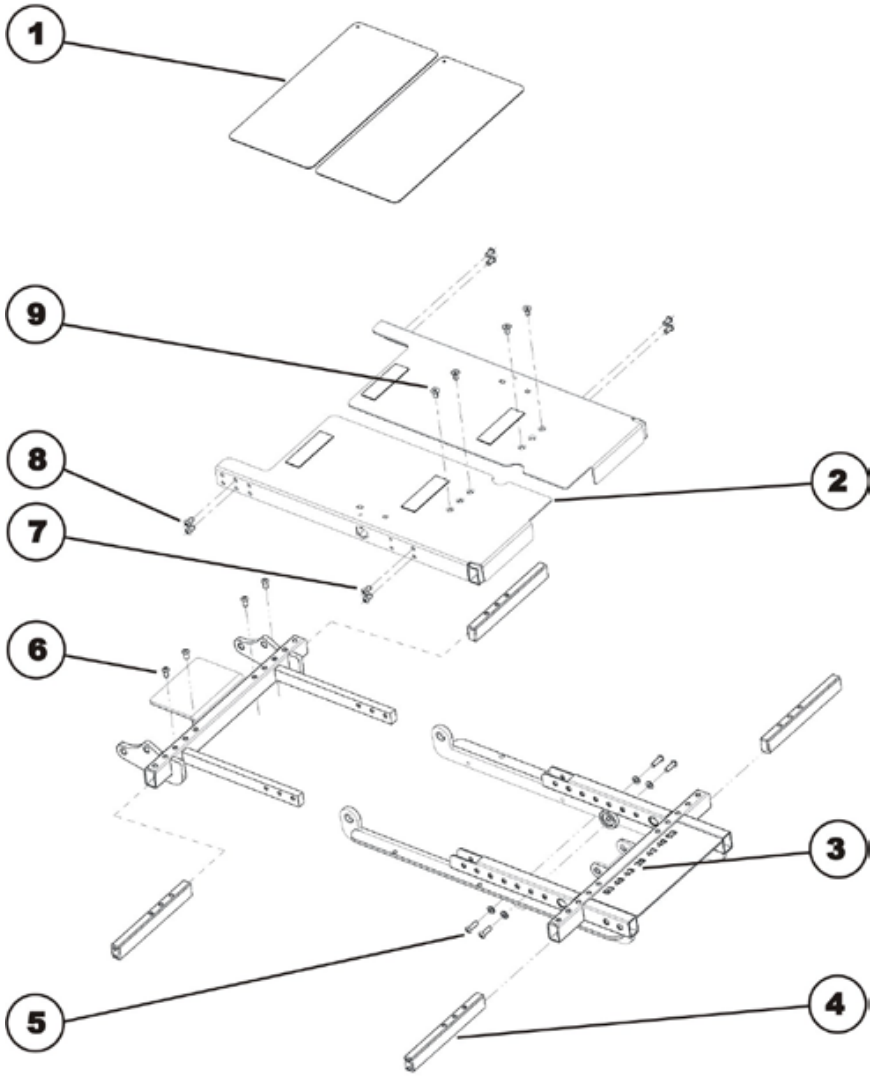
- Use the following illustration and the table to determine which holes must be used for the desired seat depth and whether the seat support plates possibly have to be replaced.

Seat frame front:



Seat frame rear:

Seat depth in cm	Holes used in seat frame front Order no.: 1524550	Holes used in seat frame rear Order no.: 1524555	Required seat support plate
38	6 & 7	A & B	SHORT Order no. 1526437
41	5 & 7	A & C	
43	4 & 6	A & C	
43	4 & 6	A & C	MEDIUM Order no. 1526438
46	3 & 5	A & C	
48	2 & 4	A & C	
48	2 & 4	A & C	LONG Order no. 1526439
51	1 & 3	A & C	
53	1 & 2	B & C	



· Adjust the seat depth as described in the following chapters:
- According to chapter 10.3.2.1 if the seat support plates do not have to be replaced.
- According to chapter 10.3.2.2 if the seat support plates have to be replaced.

10.3.2.1 Adjusting the seat depth without replacing the seat support plates

- Remove the armrests.
- Remove the seat cushion.
- Remove the cover plates (1).
- Loosen and remove the two Allen screws (8) on the rear side of the seat support plate connecting this to the cross braces (4).
- Repeat this work step on the other side of the seat.
- Loosen and remove the two Allen screws (5) incl. the washers.

Assembly:

- Pull the seat support to the desired length so that the Allen screws (5) can be placed in the holes according to the table (see above).
- Refit the Allen screws (5) incl. the washers and tighten them.
- Fit the two Allen screws (8) on the rear side of the seat support, connecting this to the cross braces (4). Unlike dismantling, different holes in the three pairs of holes must be used for the screws.
- Refit all parts that were removed.
- If necessary, replace the splash guards as described in chapter 8.1.6.

10.3.2.2 Adjusting the seat depth and replacing the seat support plates

Disassembly:

- Remove the legrests.
- Remove the armrests.
- Remove the seat cushion.
- Remove any existing cable ties holding the remote or lighting cables. Release the cables from the stuck on clamps.
- Loosen the cap nuts of the headlight mountings using an 8 mm jaw spanner (see chapter 8.7.7 or 8.7.9).
- Put the headlights and the mounting in a safe place on the rear part of the battery compartment cover.
- Remove the cover plates (1).
- Loosen the two Allen screws (9) at the top front of the seat support plate and remove them.
- Loosen the two Allen screws (7) on the front side of the seat support plate connecting this to the cross braces (4).
- Loosen the two Allen screws (8) on the rear side of the seat support plate, connecting this to the cross braces (4).
- Remove the seat support plate (2).
- Repeat this work step on the other side of the seat.
- Loosen and remove the two Allen screws (5) incl. the washers.
- Pull the seat support to the desired length so that the Allen screws (5) can be fitted into the holes according to the table (see above).

- Refit the Allen screws (5) incl. the washers and tighten them.
- If necessary, replace the seat support plates (2) according to the table (see above).
- Refit the seat support plate (2).
- Fit the two Allen screws (7) on the front side of the seat support, connecting this to the cross braces (4).
- Fit the two Allen screws (8) on the rear side of the seat support, connecting this to the cross braces (4). Unlike the dismantling of the old plates, other holes of the three pairs of holes may possibly have to be used for the screws.
- Fit the two Allen screws (9) at the front of the seat support plate.
- Refit all parts that were removed.
- If necessary, replace the splash guards as described in chapter 8.1.6.

10.3.3 Adjusting the seat width (Modulite seat)

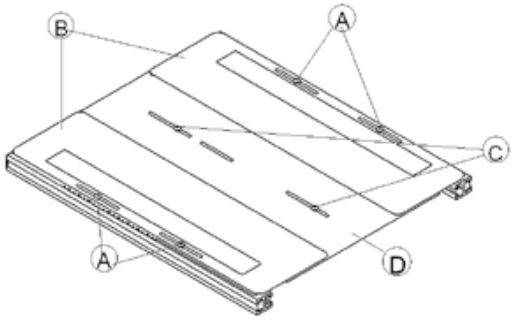
You can only adjust the seat width for the adjustable seat plate or for the adjustable sling seat.

The sling seat is available in two widths:
- for a seat width of 38-43 cm and
- for a seat width of 48-53 cm.

When modifying the seat width, the backrest width must also be correspondingly adapted. See chapter 8.17.4.

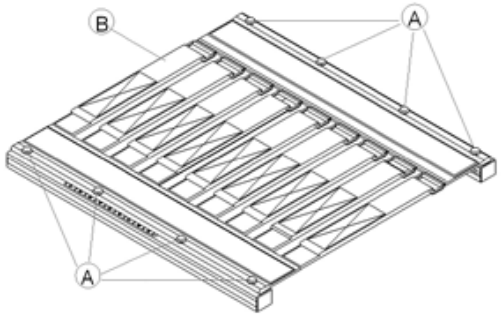
Requirements:
- 3 mm Allen key
- 5 mm Allen key
- 13 mm Open-ended spanner
- T25 Torx wrench
- T40 Torx wrench

- Remove the backrest cushion.
- Remove the backrest from the backrest mounting bracket.
  See chapter 8.17.
- Loosen and remove the screws, which secure the middle seat plate (A) with a 3 mm Allen key.
- Remove the middle seat plate (B).
- Loosen and remove the screws on both sides, which secure the lateral seat plates (C) with a 3 mm Allen key.
- Remove the lateral seat plates (D)..

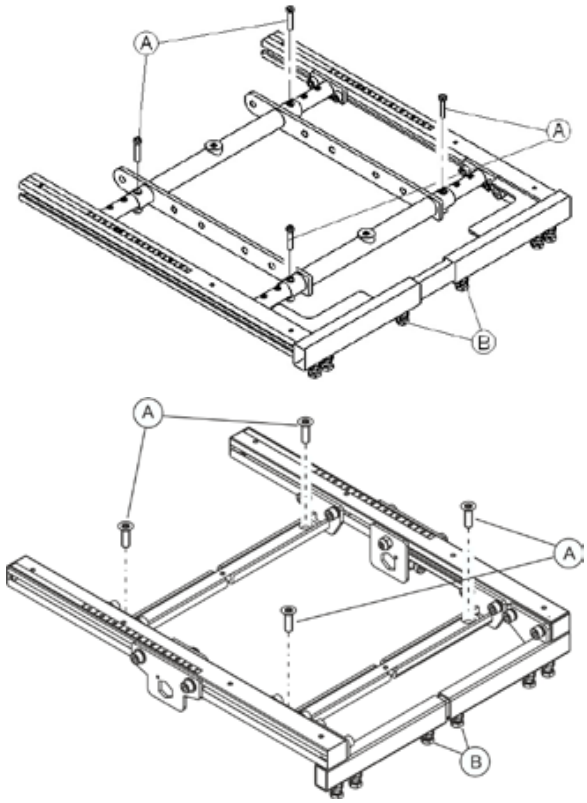


or

- Remove the seat cushion.
- Loosen and remove the screws on both sides, which secure the sling seat (A) with a T25 Torx wrench.
- Remove the sling seat (B).



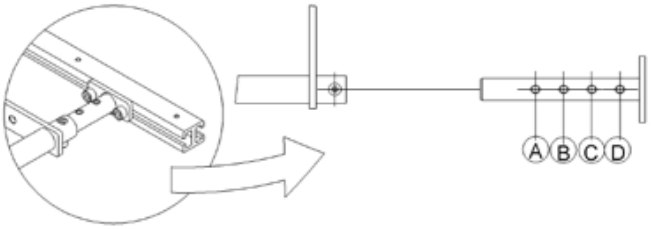
- Loosen and remove the screws of the seat frame adjustment (A) with a T40 Torx wrench.
- Loosen and remove the screws of the fixation of the legrest mounting brackets (B).



- Adjust the seat frame and the legrest fixation to the desired width according to the following illustrations and tables:

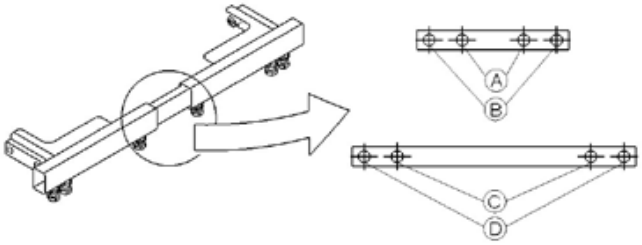
Seat frame:

Screw position	Seat width
A	530 mm
B	480 mm
C	430 mm
D	380 mm



Leg supports connection:

Screw position	Seat width
A	380 mm
B	430 mm
C	480 mm
D	530 mm
Note When switching from 430 mm to 480 mm and the other way around, the fixation of the legrests must be replaced.	



- Reposition the screws and tighten them again.
- Install the seat plate or the sling seat.
- Reposition the seat cushion.

10.3.4 Adjusting the seat depth (Modulite seat)

The seat depth is adjusted by shifting the position of the backrest.

See User Manual.

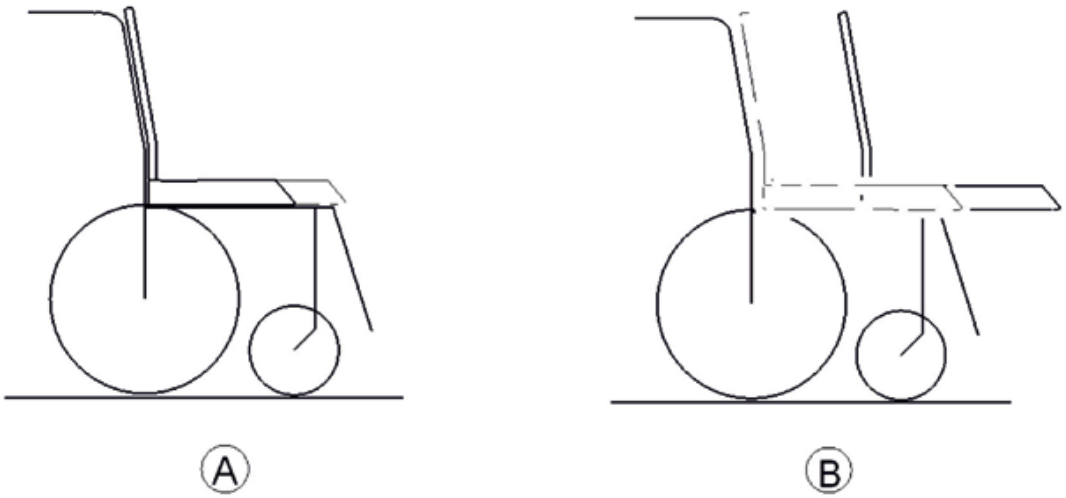
10.4 Adjusting the center of gravity of the seat

The center of gravity of the seat can be adjusted by mounting the seat frame farther towards the front or the rear on the seat.

CAUTION!

The seating system of the electric wheelchair is delivered ex works with an optimally adjusted center of gravity. Any change in this adjustment setting can negatively influence the stability of the electric wheelchair.

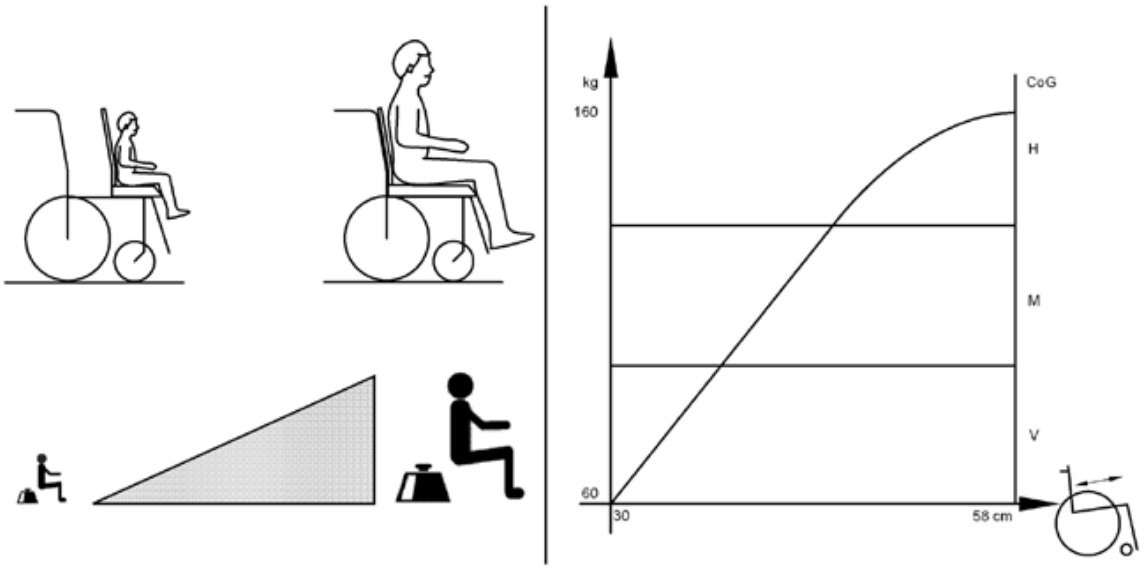
· *You must perform an individual risk analysis every time you change the center of gravity of the seating position, in order to ensure the safety and stability of the electric wheelchair.*



A: Seat depth

B: Center of gravity of the seat/ seat position

Note
The user weight and seat depth have strong influences on the choice of the Center of gravity of the seat. If the user is heavy and the seat depth is greater, the focus should be the farther back.



For best possible driving characteristics of rear-wheel drive wheelchairs, the weight to be distributed: 30 – 40 % front and 60 - 70 % rear.

WARNING!

Danger of damage due to collisions of the legrests with other parts of the wheelchair!

- *Set the legrests to the smallest angle before adjusting the seat center of gravity.*
- *Pay attention with adjusting the seat center of gravity that the legrests do not touch any other parts of the wheelchair. This ensures that the legrests can not collide with other parts of the wheelchair.*

10.4.1 Center of gravity of the seat (standard seat)

Depending on the seat that is installed, you can attach the seat at different points on the seat frame and thus set the seat depth; see chapter 10.3.2.

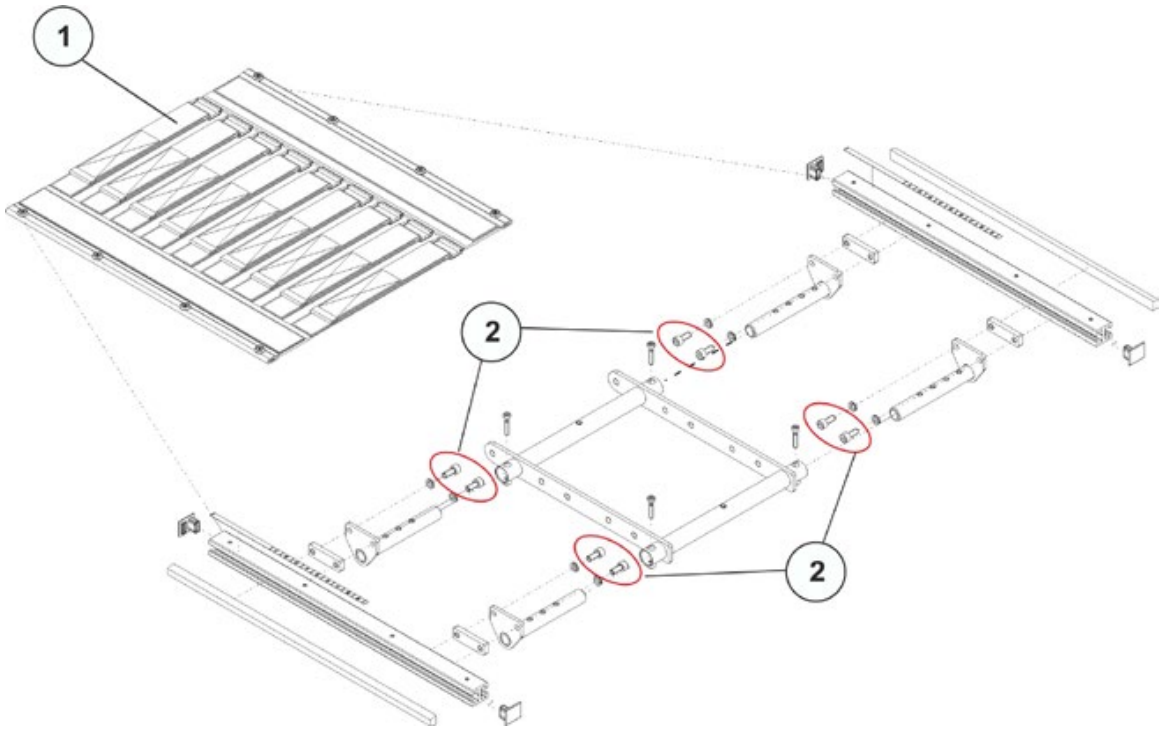
10.4.2 Center of gravity of the seat (Modulite seat)

The Modulite seat is available in two versions:

- Adjustable seats (plate and strap):
  Adjustment of the center of gravity via the lateral profiles, as described in chapter 10.4.2.1.
- Simple seat:
  Adjustment of the center of gravity via the oblong holes of the seat adaptor, as described in chapter 10.4.2.2.

10.4.2.1 Adjustable seat

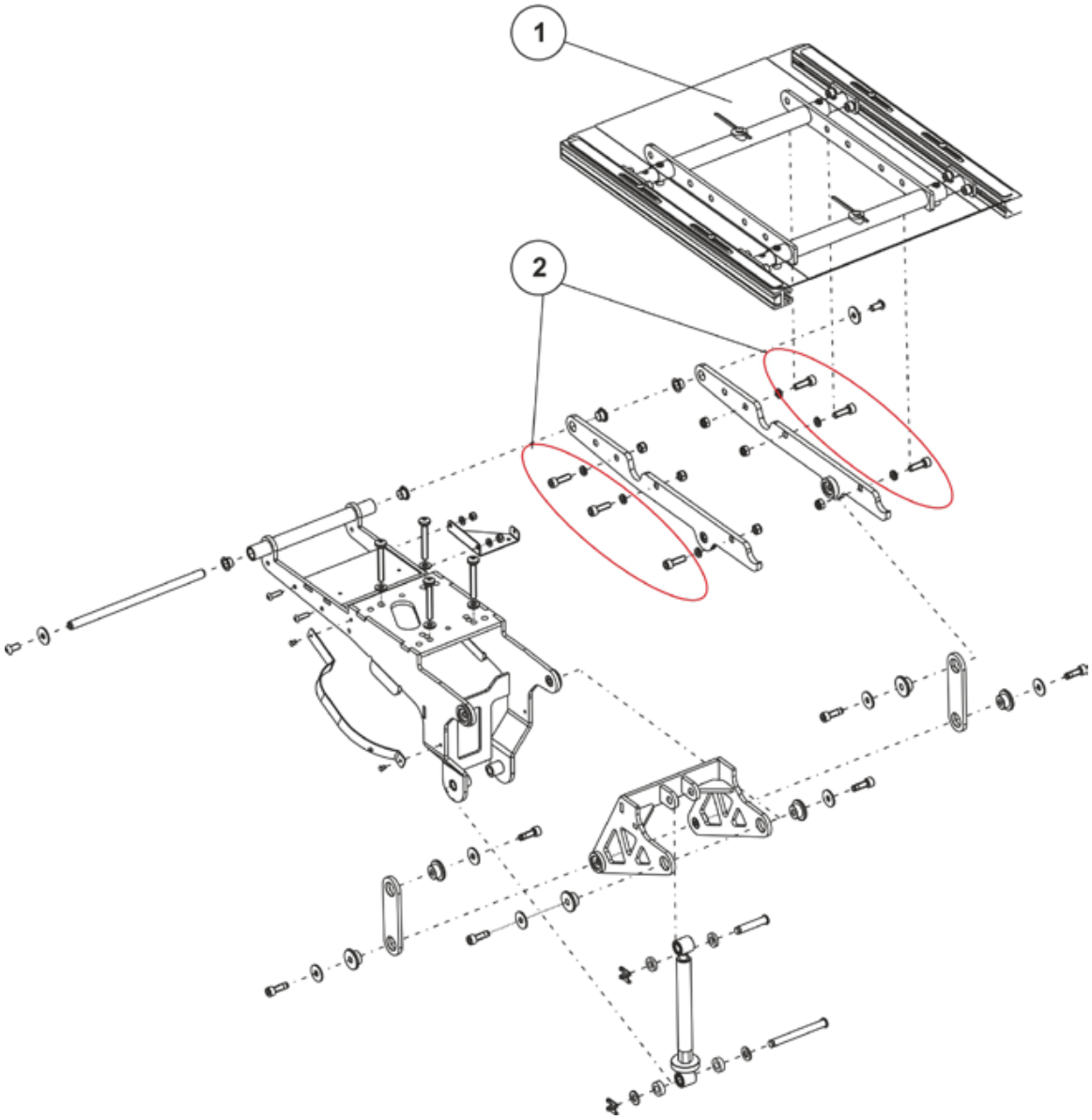
Requirements:
- 6 mm Allen key



- Remove the seat plate or sling seat (1), see chapter 10.3.3.
- Loosen the socket head screws (2) in the front and rear, left and right – DO NOT remove.
- Shift the position of the seat.
- Re-tighten the screws.
- Install the seat plate or the sling seat again.

10.4.2.2 Simple seat

Requirements:
· 6 mm Allen key



· Remove the seat plate (1) or the sling seat, see chapter 10.3.3.
· Loosen and remove the three socket head screws (2) incl. the washers and nuts on both sides.
· Shift the position of the seat frame.
· Refit the socket head screws (2) incl. the washers and tighten them.
· Install the seat plate or the sling seat again.

10.5 Adjusting the seat tilt

10.5.1 Adjusting the seat tilt on a seat with a manual tilt module (till Dec. 2010)

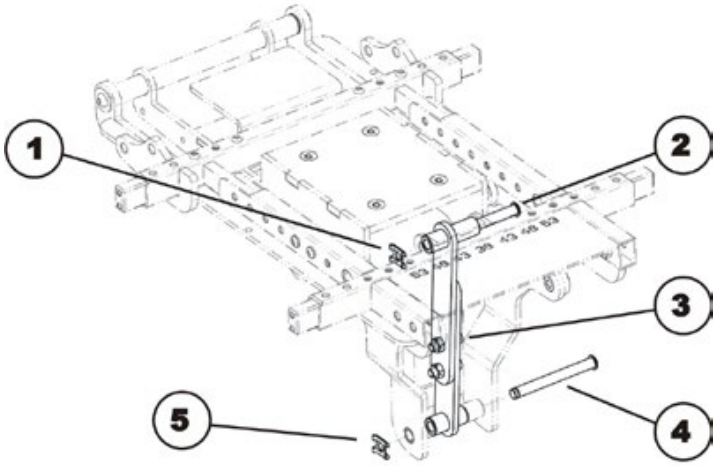
WARNING: Danger of crushing!

The seat/seat support is very heavy. Injury hazard to hands and feet!

- *Use proper lifting techniques.*

Requirements:

- 6 mm Allen key



- Please take into account that the seat is very heavy. Be sure not to crush your fingers or other parts of the body. Use proper lifting techniques.
- Loosen and remove the two Allen screws (3) with a 6 mm Allen key.
- Tilt the seat to the desired gradient.
- Place the two parts of the strut on top of each other.
- Refit the Allen screws and tighten them.
- To conclude, check all the mobility aid functions.

10.5.2 Adjusting the seat tilt on a seat with a manual tilt module (from Dec. 2010)

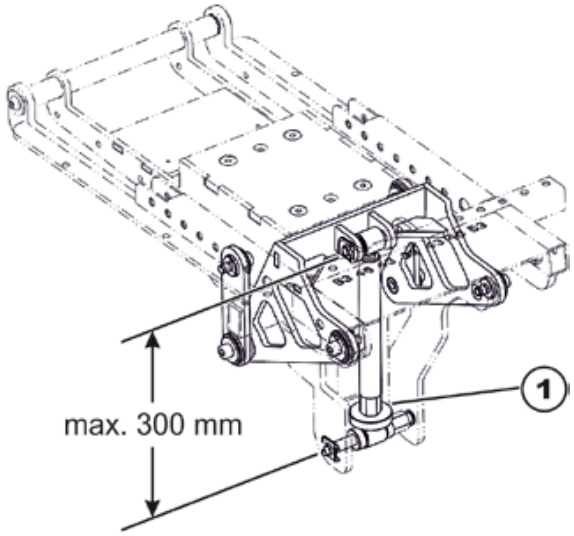
WARNING: Danger of crushing!

The seat and frame are very heavy and can fall down without warning if the seat tilt adjustment assembly is screwed apart too far. Danger of injury to hands and feet!

- *Only change the adjustments when someone is seated in the chair.*
- *Only change the tilt adjustment to where the distance between the axles is a maximum of 300 mm.*

Requirements:

- 19 mm open-end wrench
- Measuring tape



- Apply the open-end wrench to the hexagon bolt (1) of the tilt adjustment.
- Turn the tilt adjustment till the desired angle is attained or the distance between the bolts is a maximum of 300 mm.